Natural Resources Canada | Ressources naturelles Canada

SUSTAINABLE DEVELOPMENT STRATEGY

Moving Forward

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Canada

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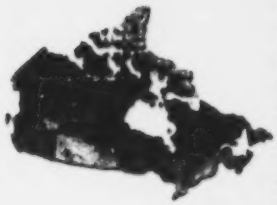

SUSTAINABLE DEVELOPMENT is central to the mandate of Natural Resources Canada (NRCan). In some respects sustainable development is a challenge, but it also brings opportunities for Canadians—helping us to maintain the benefits of resource development, fuelling innovation to create new benefits, and ensuring that future generations will also be able to enjoy a high quality of life, supported in part by our great wealth of natural resources.

Canada's natural resource sectors and allied industries are dynamic and innovative, driving economic growth and creating new opportunities for Canadians. Millions of Canadians in over 650 communities—many in northern, rural or remote areas—depend on the natural resource sectors for their livelihoods. Canada's natural resources are at the heart of vital components of our economy and figure prominently in the social fabric of our country.

NRCan is charged with the federal responsibility for ensuring the sustainable development of Canada's energy resources, minerals and metals, and forests, and for providing the geographical and geological information base that supports decisions about Canada's land-based and offshore resources. The Sustainable Development Strategy (SDS) is a key tool for addressing the challenges and taking advantage of the opportunities related to sustainable development through the Department's policies, programs, science and technology, legislation, regulation and operations.

Moving Forward is the Department's third three-year strategy and the next step in the evolution of NRCan's approach to sustainable development. It is formulated as a results-based action plan, guided by a unified, forward-thinking vision and an organizational commitment to sustainable development that encompasses all of NRCan's diverse activities.

The summary chart on the right illustrates the linkages between the key results that NRCan wants to achieve, the issues that must be addressed to achieve them, and the actions the Department is planning to take during the next three years. In the SDS, each of the actions listed on the summary chart is expanded into specific action items with measurable, time-bound targets.

Summary Chart: Sustainable Development Strategy—*Moving Forward*

Issues	Key Results	Actions
• Significant information gaps exist in the baseline knowledge that feeds decision making • More work is needed on the development and refinement of sustainable development indicators for the resource sectors • Increases in efficiency alone will not be enough to meet our sustainable development objectives—S&T must provide new solutions • Small- and medium-sized enterprises in the resource sectors need to increase their understanding and uptake of sustainable development • Aboriginal, northern, rural and remote communities face unique and difficult sustainable development challenges • Canadians understanding of sustainable development is increasing, yet this is not reflected in consumer trends	**1) Canadians make better decisions that advance sustainable development** **As evidenced by:** • increased individual, community and organizational capacity • increased public stewardship (e.g. participation in recycling programs) • increased participation in decisions about land and resource development/use • increased skills and employment opportunities • maintained/increased economic contribution of natural resources to GDP • increased investment in natural resource sectors and allied industries • increased effectiveness of regulation and efficiency of regulatory processes • increased multi-stakeholder dialogue	1.1 Provide knowledge and decision-support tools for resource decision-makers 1.2 Undertake science and technology and develop strategies to advance resource stewardship 1.3 Increase understanding of water resource supply and minimize impacts of natural resource sector activities on aquatic ecosystems 1.4 Apply, support and share best practices and models 1.5 Support policy, dialogue and governance to increase the contributions of Canada's resource sectors to sustainable development 1.6 Engage Aboriginal communities in sustainable land and resource development and use 1.7 Facilitate skills development and increase public outreach
• Canada needs to take action on many fronts to reduce greenhouse gas emissions, in order to make progress towards meeting international commitments • There will be increasing environmental, social and economic impacts resulting from climate change—Canada needs to be prepared	**2) Canadians are taking action to reduce greenhouse gas emissions and adapt to the effects of climate change** **As evidenced by:** • decreased emissions of greenhouse gases and pollutants • improved energy efficiency • increased production and use of renewable energy • increased levels of resource recovery and recycling • increased deployment of eco-efficient technologies • increased understanding of Canada's vulnerabilities to climate change impacts • increased development and application of targeted adaptation strategies, plans and actions	2.1 Advance policy and dialogue to address climate change 2.2 Achieve emissions reductions through energy efficiency, renewable and alternative energy, and carbon sequestration 2.3 Establish greenhouse gas emissions reduction targets for key industry sectors 2.4 Undertake science and technology to reduce greenhouse gas emissions, and improve Canada's ability to further mitigate and adapt to climate change impacts
• Many key issues facing sustainable development cannot be addressed by one country acting alone—global issues require international solutions • Unsustainable resource development abroad can negatively affect Canada—it is in Canada's interest to build sustainable development capacity abroad • Barriers to international trade of resource products negatively affect Canada's economy	**3) Canada is globally recognized as a responsible steward of our natural resources and is a leader in advancing sustainable development internationally** **As evidenced by:** • maintained or increased market access for Canadian resource products and producers • increased investment in Canada's natural resource sectors • increased use of voluntary stewardship initiatives by resource sectors • increased recognition of the importance of natural resources to sustainable development • increased international dialogue related to sustainable development within the natural resource sectors	3.1 Address issues related to resource access within Canada, and international market access issues concerning Canadian natural resource products and producers 3.2 Forge partnerships for advancing the contributions of natural resource sectors to sustainable development internationally 3.3 Promote best practices for sustainable development abroad
• To promote sustainable development effectively, government must have its house in order • There is a need to improve the data that can demonstrate progress on sustainable development objectives • This is an opportunity to lead by example	**4) NRCan demonstrates its commitment to sustainable development in its operations** **As evidenced by:** • implementation of an environmental management system • management of emissions and effluents • reduced energy consumption/greenhouse gas emissions • reduced water consumption • sustainable land use	4.1 Improve NRCan operations through sound environmental management 4.2 Develop and implement further strategies to improve resource use efficiency and reduce greenhouse gas emissions in NRCan facilities

Digital mosaic of Canada, produced by Natural Resources Canada

Photos: First Nations Forestry Program, NRCan photo collection and Roberta Gal, Canadian Forest Service

As a respected steward of significant natural resources, Canada recognizes its global responsibility to ensure their sustainable development, for the benefit of all citizens, both now and for the future. The decisions that are made today about how we produce, consume and trade our forest, mineral, and energy resources, will affect our economy and communities, demonstrate our responsibility to the environment and future generations, and help define us as a society.

In its efforts to achieve the four key results that form the focal points of ***Moving Forward***, NRCan is working to create the conditions that will encourage and facilitate the contribution of natural resources to sustainable development. Federal policy development, legislation and regulation are one part of this task. In partnership with other governments, academia and the private sector, NRCan will also continue to work on expanding the boundaries of our scientific knowledge, advancing new technologies, investing in the development of value-added processing opportunities, and integrating our information resources and making them widely available. All of this is part of creating an environment in which the potential of sustainable development can be realized.

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Canada

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Digital mosaic of Canada, produced by Natural Resources Canada (Canada Centre for Remote Sensing)
The digital mosaic of Canada is a composite of individual satellite images. The colours reflect differences in the density of vegetation cover: bright green for dense vegetation in the humid southern regions; yellow for semi-arid and mountainous regions; brown for the far north where vegetation cover is very sparse; and white for the Arctic regions.

Sustainable Development Strategy: *Moving Forward*

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Minister's Message

Canada's natural resources have long supported our way of life. Resource development is a key driver of our nation's economy, the foundation of many communities and a part of our culture. So, it is not by accident that natural resources are at the forefront of the sustainable development debate—ultimately, they sustain us all.

Natural Resources Canada (NRCan) plays a critical role in enabling sustainable development across Canada and promoting it around the world.

One of our primary tasks is to expand and improve our knowledge of natural resource development. In carrying out this work, we advance understanding and commitment among all stakeholders to ensure their informed participation in decision-making processes.

Canada is a world leader in sustainable development and intends to continue breaking new ground and ensure our place in the world. NRCan will continue to encourage international dialogue on natural resources and sustainable development.

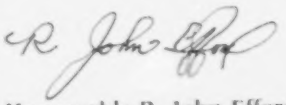
NRCan supports a culture of innovation—applying cutting-edge technologies to add value to natural resources, investing in research and development, and promoting Canadian technologies and expertise abroad to build a 21st-century economy. We will continue to work with the Canadian resource and allied industries to showcase our achievements in sustainable development and help ensure international market access for our resource-based products and companies.

Sustainable Development Strategy—Moving Forward demonstrates how NRCan is taking the next steps forward to optimize the contribution of natural resources to sustainable development. We will rely on the Department's core areas of expertise to focus our actions where they can make the most difference.

Like good governance, sustainable development is a process of continuous improvement, and learning to be careful stewards of our resources has involved some hard lessons. As our knowledge grows, we are better able to identify emerging issues and new opportunities to improve our prosperity and quality of life.

With careful stewardship and a commitment to knowledge and innovation, we will be able to continue enjoying many of the benefits we derive from our natural resources and explore new opportunities for strengthening the foundations of Canadian life.

We all share the responsibility of ensuring that future generations of Canadians will also enjoy these advantages. Like our natural resources themselves, sustainable development must become part of our identity and our way of life.



The Honourable R. John Efford, P.C., M.P.
Minister of Natural Resources Canada

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I: Introduction

Sustainable development is central to the mandate of Natural Resources Canada (NRCan). In some respects sustainable development is a challenge, but it also brings opportunities for Canadians—helping us to maintain the benefits of resource development, fuelling innovation to create new benefits, and ensuring that future generations will also be able to enjoy a high quality of life, supported in part by our great wealth of natural resources.

Canada's natural resources, and efforts to develop them, have greatly influenced the history of our country. The natural resource sectors and allied industries have been an engine of economic growth and job creation for generations. Today, millions of Canadians, in over 650 Canadian communities from coast to coast to coast—many in northern, rural or remote areas—depend on the natural resource sectors for their livelihoods. Together with related equipment, supply and service industries, Canada's forestry, minerals and metals, and energy sectors are vital components of our overall economy and society—in no other country are the natural resource sectors as important to the economy as they are in Canada. Our natural resources-based industries are dynamic and innovative, and will continue to be a force in building Canada's future.

The Government of Canada applies the Brundtland definition of sustainable development:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Our Common Future
World Commission on Environment and Development, 1987

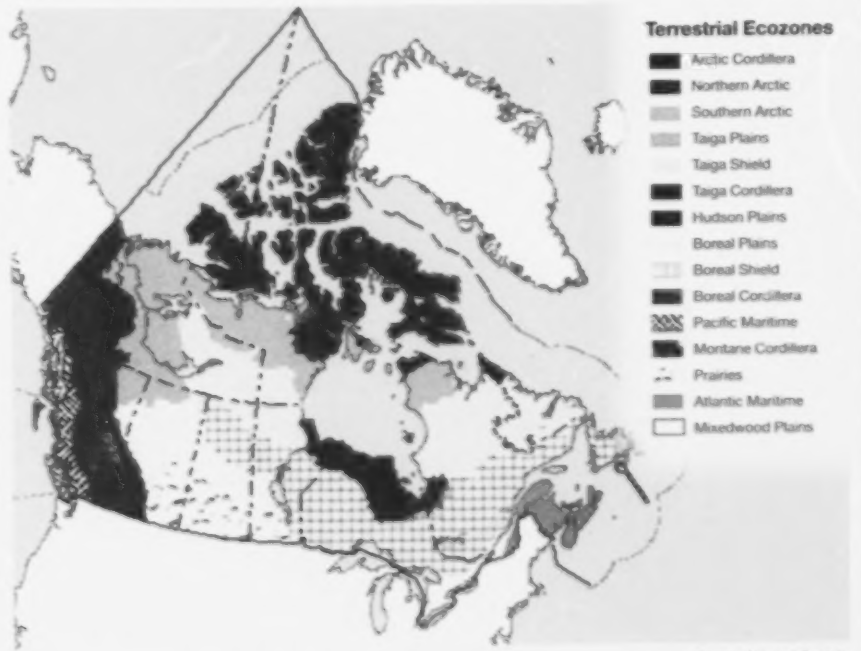
The magnitude and diversity of Canada's natural resources are truly astonishing. Not only does our landscape supply us with the raw resources that are the foundation of a significant portion of our economic activity, it also provides essential ecological services—such as clean air and water—which are essential to our economy, environment and quality of life. On an aesthetic and spiritual level, the vast expanse of the land itself is valued by many as an important aspect of being Canadian. This remains true even as Canada's population becomes increasingly urban.

Canada is the world's second largest country in land mass and possesses a significant diversity of physiology, geology, vegetation and climate regions. Canada can be looked at in terms of its 15 distinctive terrestrial ecozones (there are also five marine ecozones), each with its own mosaic of unique features, and communities that demonstrate Canada's cultural diversity. The map of Canada's ecozones indicates the rich ecological diversity of the country. Natural resource-based activities figure prominently in Canada's economy, across ecozones.

Forest covers almost half of the Canadian landscape, representing over 10 percent of the world's forest cover, 25 percent of the world's natural forest, 30 percent of the world's boreal forest and 20 percent of the world's temperate rainforest. Our forest includes some of the world's largest intact forest ecosystems. Nearly 94 percent of Canada's forest is public land. Given this unique inheritance, Canada has both local and global responsibilities to sustainably manage its forest.

Every day people use products that are derived from the mineral richness of the Earth. Canada produces more than 60 minerals and metals, making it a world leader in production and export. Canada ranks first in the world for the production of potash and uranium, and ranks in the top five for more than a dozen other minerals and metals. Canada is number one in the world in terms of exploration expenditures and continues to open up new opportunities, as evidenced by Canada's emergence as a major force in world diamond production.

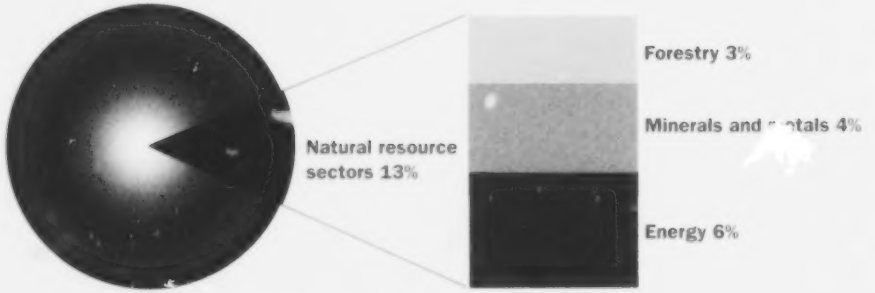
Ecozones of Canada



Source: Atlas of Canada

The abundance and diversity of Canada's energy resources provide Canadians with secure and reliable sources of energy. As a net exporter of all forms of energy, Canada makes a significant contribution to global energy security and diversity. Canada is the world's largest producer of hydro-electricity, the third largest producer of natural gas, and our Western Sedimentary Basin has oil sands reserves exceeding 300 billion barrels. Our nuclear power industry operates reactors in Canada, fuelled by domestic uranium, and exports its technology around the world. Canada recognizes the importance of energy efficiency, and research and development of renewable and alternative energy sources for a sustainable future.

Natural Resource Sectors' Contributions to GDP, 2002



The importance of natural resources to Canada's society and economy have placed the natural resource sectors at the centre of the sustainable development debate. Canada has taken up the challenge of demonstrating how commitment to stewardship, knowledge, innovation, and capacity building make it possible to diminish adverse environmental impacts from resource development and use, while building world-leading industries and strong, sustainable communities. How well Canada manages to advance the integration of social, economic and environmental considerations into decision making that respects the interests of all stakeholders will impact our ability to realize the tremendous growth potential of our resource industries.

The Canadian resource sectors include some remarkable firms that have demonstrated global leadership on sustainable development within the private sector. This strong corporate leadership is helping to spread the commitment to sustainable development within the resource and allied industries generally, as more companies come to understand and accept the business case for sustainable development. Canadian government and industry will continue to work together to ensure the growth of globally competitive industries that are socially and ecologically responsible, contributing to our nation's prosperity and maintaining Canada's status as a world leader both in the evolution of our natural resources industries and in advancing sustainable development.

Canada's resources contribute to the well-being of countless users in many countries around the world through a wide variety of applications. As a respected steward of these indispensable resources, Canada recognizes its global responsibility to ensure their sustainable development, for the benefit of all citizens, both now and for the future. The decisions that are made today about how we produce, consume and trade our forest, mineral, and energy resources, will affect our economy and communities, demonstrate our responsibility to the environment and future generations, and help define us as a society.

NRCan's contribution to sustainable development

NRCan is charged with the federal responsibility for ensuring the sustainable development of Canada's energy resources, minerals and metals, and forests, and for providing the geographical and geological information base that supports decisions about Canada's land-based and offshore resources. The federal role in natural resources complements the work of the provinces, which own and control much of Canada's land and resources.

The *Department of Natural Resources Act* states that "in exercising the powers and performing the duties and functions assigned to the Minister ... the

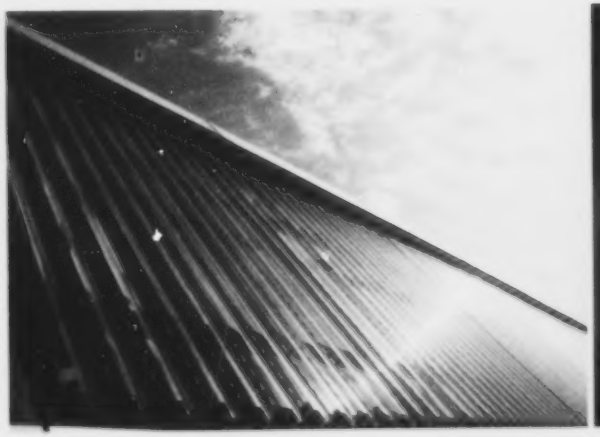
Minister shall have regard to the sustainable development of Canada's natural resources and the integrated management thereof." Fundamental to sustainable development is a common understanding that development is essential to satisfying human needs and improving quality of life, but that it must be based on the efficient and responsible use of natural, human and economic resources.

In advancing the mandate of the Department, NRCan contributes to sustainable development by:

- conducting scientific research and developing leading-edge technologies to maximize social and economic benefits for Canadians and our global neighbours while minimizing environmental risks and impacts;
- building national knowledge infrastructure about Canada's geography and geology, including data on its natural resources on and below the land and beneath the sea floor;
- providing ideas and information to support wise and efficient management and use of natural resources, reduce costs and create innovative products and services for the international marketplace;
- working to enhance the contribution of natural resources to Canada's economy—as NRCan and other federal regulators find better ways to regulate while protecting the health and safety of Canadians and the environment—and encouraging coordination among regulators;
- encouraging and facilitating how the natural resource sectors incorporate environmental, economic and social considerations into decision-making through environmental and life-cycle assessments; and,
- promoting Canada's interests in areas affecting natural resources, through cooperation with international agencies and other nations, to meet our global commitments and to maintain access to world markets for Canadian products, technologies and services.

Through this work, NRCan is helping to build Canada's reputation as a world leader in sustainable development, and a quality producer of innovative resource-related products, technologies, services and research. NRCan enables innovation in these areas by providing the coordination, knowledge, expertise and leadership required to accelerate progress on sustainable development—both at home and abroad.

Canada's wealth of experience and expertise—including our ability to use and develop natural resources responsibly, to mitigate potential impacts from



Roles and responsibilities for natural resources in Canada

Federal	Provincial	Private Sector	General Public
• National economic policies and taxation • International relations and agreements • Trade (international and inter-provincial) • Northern Canada, federal lands and offshore • Indian lands and Aboriginal land claims • Wildlife—species at risk, migratory birds, fisheries habitat and oceans • National statistics • Science and technology (in the national interest) • Environmental protection (international and inter-provincial) • Nuclear energy policy, research and regulation • National parks • Building national consensus • National knowledge infrastructure • Support disaster mitigation and emergency response activities	• Provincial economic policies and taxation • Land use planning and allocation • Resource ownership and royalties • Resource management (regulation and licensing; allocation and control of harvesting and extraction; conservation; protection) • Aboriginal land claims • Fish and wildlife • Provincial parks • Environmental protection (provincial and local) • Science and technology • Provincial/territorial statistics and resource inventories	• Investment • Payment of taxes and royalties • Operational resource management and planning • Resource exploration, extraction and harvesting • Resource processing and manufacturing • Pollution prevention and waste management • Product development and marketing • Research and development • Private land stewardship	• Social values • Input into decision making • Consumer choices and purchasing • Political choices and advocacy • Investment • Recreation • Private land stewardship

resource development, and to develop technologies that increase economic and environmental performance—can benefit resource managers worldwide. NRCan demonstrates its leadership internationally by sharing its state-of-the-art knowledge and transferring technology to its global neighbours.

The natural resource sectors and related disciplines that NRCan works with to fulfill its mandate include energy, forestry, geography, geology, geomatics, minerals and metals, and the network of allied industries (such as ocean technology and geological consulting). NRCan also works with other federal departments and agencies, other levels of government, academic institutions, and non-government organizations and agencies, including Aboriginal organizations, environmental and community organizations.

The role and fit of NRCan's Sustainable Development Strategy

NRCan was the first federal department to enshrine sustainable development in its mandate and legislation, and was one of the first departments to have an environmental policy to guide its internal operations and procurement. As well, critical documents promoting sustainable development, such as the National Forest Strategy and the Minerals and Metals Policy of the Government of Canada, pre-date the preparation of departmental sustainable development strategies.

NRCan's Sustainable Development Strategy (SDS) is a key tool for addressing the challenges and taking advantage of the opportunities related to sustainable development through the Department's policies, programs, science and technology, legislation, regulation and operations. It also serves as a companion piece to policies and strategies within NRCan's operational sectors. The Department's third strategy, ***Moving Forward***, is formulated as a strategic planning document—a guidepost able to provide a unified, forward-thinking vision and articulate an organizational commitment to sustainable development that encompasses all of the Department's diverse sectors and activities.

Photo credit: First Nations Forestry Program

A Sustainable Forest

Canada's forest-related interests, benefits and values have evolved and expanded over time. As a result, new knowledge and technologies, responsibilities and partnerships have emerged that constantly increase our understanding of Canada's forest and how we, as citizens of a forest nation, relate to it. To keep pace with this change, we continue to deepen our knowledge about the forest.

Canada's National Forest Strategy is a consensus document that guides Canadians in their ongoing work in sustainable forest management. It is for all Canadians to implement and it reconfirms the country's collective commitment to work together towards the goal of a sustainable forest, nationwide. The new fifth National Forest Strategy (2003–2008), A Sustainable Forest: The Canadian Commitment was unveiled at Canada's 9th National Forest Congress, held in May 2003.

Addressing federal sustainable development priorities

The Strategy also provides a linkage between the Department's activities and the federal government-wide priorities for sustainable development: Sustainable Federal House in Order, the federal role on freshwater, and implementation of international commitments from the World Summit on Sustainable Development.

The Government of Canada recognizes that if it wants to inspire Canadians to work towards sustainable development, it must demonstrate leadership and commitment in its own operations. NRCan is the co-champion of Sustainable Federal House in Order, an initiative focussed on helping federal departments to integrate sustainable approaches and actions in their day-to-day activities. Current work towards a system for uniform measurement and collective reporting will effectively demonstrate the government's progress on greening its operations. The activities described under the fourth key result of ***Moving Forward***, *NRCan demonstrates its commitment to sustainable development in its operations*, represent the Department's efforts to align its internal operations with the principles of sustainable development, and its contributions to government-wide initiatives.

Canadians place a very high priority on safeguarding the safety and quality of the nation's water resources, particularly the freshwater resources that communities depend upon. Federal responsibility for water does not rest solely with NRCan but is shared among a number of departments. As the importance of safeguarding our water has risen as a national priority, it has become clear that a better focus and greater degree of coordination at the federal level is required. NRCan is working closely with other federal departments in developing a more strategic approach to addressing nationally significant freshwater issues. Our contribution is in supporting the development of innovative science and technology based solutions to water-related challenges across the natural resource sectors. This priority will also be reflected in NRCan's work with communities both within Canada and around the world to improve their capacity to better manage their natural resources. Within ***Moving Forward***, the NRCan actions in support of this priority are found under key results 1 and 3.

Canada's sustainable development efforts at home must be situated in the context of our international obligations, foreign policy and trade initiatives, and development assistance activities, as well as within our economic, social and environmental policies and priorities. The Johannesburg Plan of Implementation (JPOI), endorsed by Heads of State at the World Summit on Sustainable Development (WSSD), held in South Africa in 2002, presents a significant opportunity for the federal government. Throughout its involvement in the WSSD process, Canada attached great importance to ensuring that the WSSD reaffirmed the centrality of effective, accountable governance to the achievement of sustainable development. For more information on NRCan's involvement with the WSSD, please refer to Appendix 4.

Evolution of NRCan's Sustainable Development Strategy

Making meaningful contributions to sustainable development requires consideration of the challenges, prioritizing actions to respond, and periodic assessment to ensure relevancy. NRCan's sustainable development strategies have provided the opportunity for the Department to do this, first with its 1997 Strategy, and then in 2001. The process of developing ***Moving Forward*** has resulted in a new focus for the advancement of sustainable development related to Canada's natural resources.

The first efforts of an organization to see itself through the lens of sustainable development often involve delving into every corner of its operations and areas of responsibility. Attempting to be thorough can yield significant benefits: revealing the paths where progress is under way and creating a substantial inventory of potential areas for improvement. However, in the Department's assessment of its two previous sustainable development strategies, it was noted that the documents were not yet fulfilling their potential to *influence change towards sustainable development*. To fulfill its purpose as an effective strategic planning document and to 'raise the bar' for sustainable development, ***Moving Forward*** focuses on the *significant and essential* outcomes the Department wants to achieve.

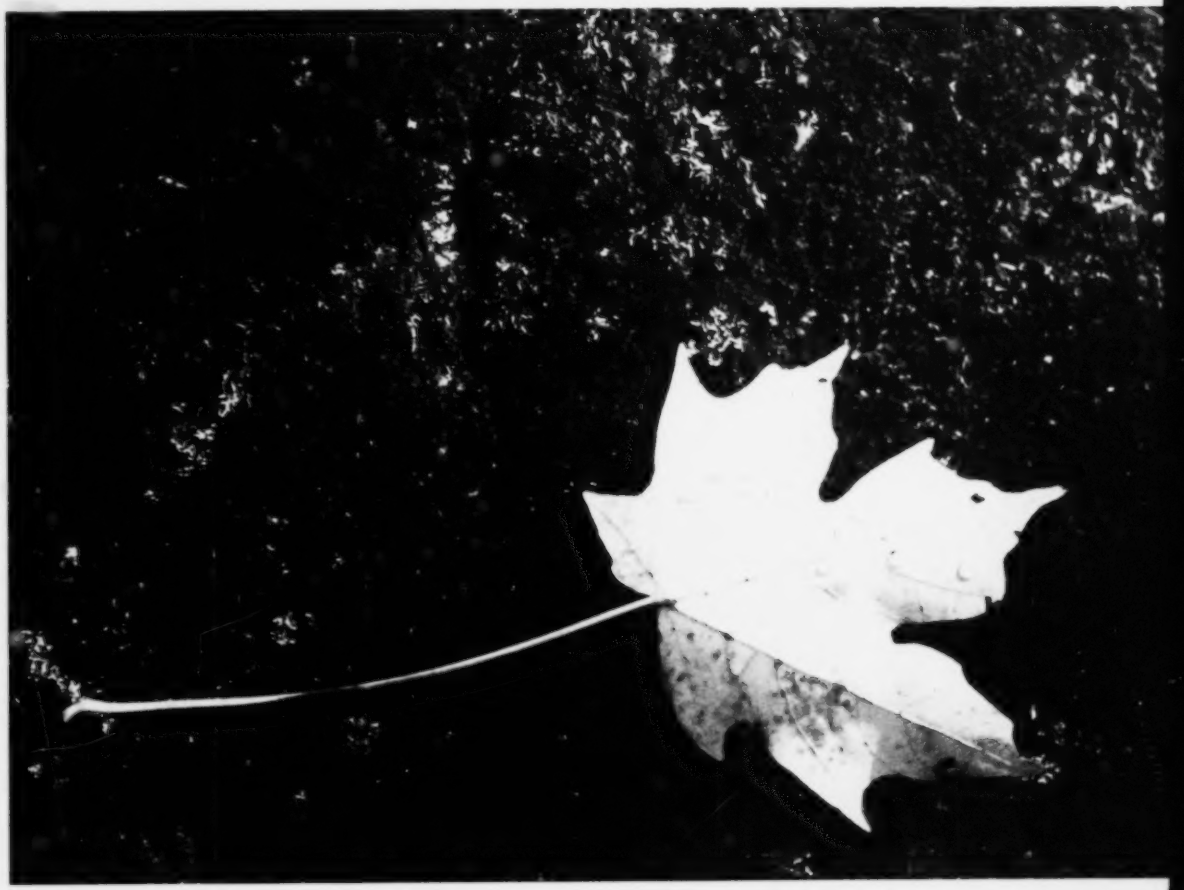
Moving Forward is based on the foundation of earlier strategies. It articulates the Department's contribution to sustainable development in Canada and internationally. However, this Strategy does not attempt to encompass all the sustainable development issues of concern to NRCan, nor all of its relevant activities. Significant effort has gone into identifying the most crucial areas, central to the Department's mandate, where there is both a need and an opportunity to make measurable progress towards the Department's broad sustainable development goals.

Through the consultation process that has informed this Strategy (see Appendix 2), and refined by discussions among senior officials, the focus for ***Moving Forward*** was narrowed to the four key areas where the activities of the Department can spur or create measurable results on the ground. While there are fewer actions identified than in previous strategies, they are the ones that will address the issues identified through the consultation process, have the greatest impact, and do the most to move the Department closer to its vision for the future.

Moving Forward is the next step in the evolution of NRCan's approach to sustainable development. It focuses on key results that are considered by NRCan, its clients and partners, to be the most significant and essential to the natural resource sectors.

II: Vision

Sustainable development—often referred to as a journey, rather than a destination—is a process of change. NRCan has been engaged in this process of change for many years. Our understanding has evolved, from an initial focus that concentrated on balancing economic growth and environmental protection, to a more holistic vision of sustainable development that sees the interdependence of society, economy and environment. NRCan has articulated a vision of the future that reflects the opportunities and benefits inherent in sustainable development. The vision is the foundation for the Department's Sustainable Development Strategy. It has been updated to reflect current thinking and priorities, and condensed to focus on the issues of greatest importance to Canadians that relate to sustainable development and Canada's natural resources.



NRCan's vision for a sustainable future

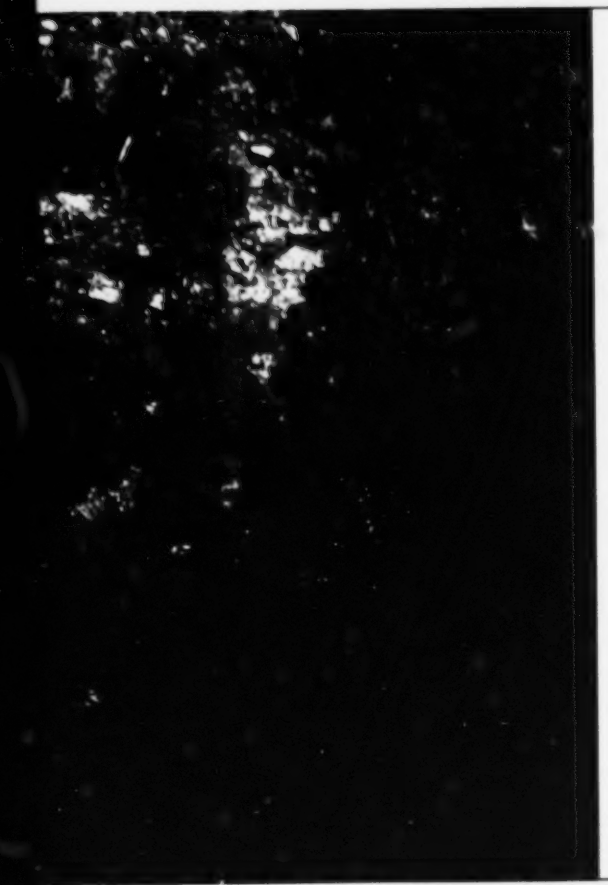


Photo credit: Roberta Gal, Canadian Forest Service

Canada's natural resource sectors will forge new thinking, build alliances and invest in innovation, making significant contributions to sustainable development within Canada and around the globe. As a nation we will see advanced levels of corporate and consumer knowledge, growing commitment to social and environmental responsibility, and adoption of life-cycle approaches to resource development and use. Canadians will have the knowledge and ability to seize opportunities, address challenges, compete successfully in the global marketplace and generate continued social and economic benefits.

Canada will be recognized as a world-leading provider of innovative products, practices and technologies, and respected worldwide for stewardship of our natural resources. Natural Resources Canada's leadership on sustainable development policy and practices, investment in research and development, and commitment to knowledge, capacity building, and science and technology will play a significant role in turning this vision into reality. We will work with stakeholders to ensure prosperity in Canada's cities, rural areas and Aboriginal communities, and with our global partners to advance sustainable development around the world—raising quality of life at home and abroad.

This is not a vision that the Department has produced solely on its own. The vision reflects the ideas and priorities of the stakeholders who contributed their time and energy to the consultations NRCan held leading up to the drafting of ***Moving Forward***. The vision is also intended to complement and build upon preparations for a Government of Canada vision for sustainable development, elaborating on the contribution of natural resources development and use to the sustainable development of Canada and the world.

Neither is this a vision that NRCan can turn into reality on its own. Making sustainable development the Canadian way of life will require the support and participation of all levels of our society. For Canadian governments, sustainable development indicates the need for a long-term focus to enhance economic, social and environmental well-being; finding a balance between improving the quality of life for Canadians now and ensuring positive opportunities for the future. For individual Canadians, lifestyle choices such as household energy use, where we live and how we travel may have implications for sustainable development. Collective decisions made within a community regarding land use and infrastructure planning can be made to enhance the long-term quality of life of residents. Canadian business can make a positive contribution to sustainable development by taking a 'triple bottom line' approach to decision making—in other words, an approach that seeks to reconcile social, environmental and economic issues, priorities and goals in their operations, both in Canada and internationally.

NRCan's vision may also be positioned as a complement to visioning and planning exercises undertaken by Canadian businesses, communities and other stakeholders in Canada's resource sectors. There are many natural resources-based companies in Canada making it their priority to integrate the principles of sustainable development in their business practices and investment activities, at home and abroad, recognizing that this commitment can be a key competitive advantage in the international marketplace. There are Aboriginal communities planning their future as forest farming communities, communities creating new economic opportunities to allow them to be self-sustaining after the closure of a mining operation, and urban regions developing 20-year plans to improve the quality of life they offer.

NRCan's role in turning vision into reality is in creating a state of affairs that encourages and facilitates the contribution of natural resources to sustainable development. Federal policy development, legislation and regulation are one part of this task. In partnership with other governments, academia and the private sector, NRCan will also continue to work on expanding the boundaries of our scientific knowledge, advancing new technologies, investing in the development of value-added processing opportunities, and integrating our information resources and making them widely available. All of this is part of creating an environment in which sustainable development will flourish.

III: The Issues

In keeping with the direction established for ***Moving Forward*** (see Evolution of NRCan's Sustainable Development Strategy), this section takes a brief look at the main issues threatening the Department's vision of sustainable development, concentrating on specific issues that fall within NRCan's mandate. It became clear during the consultations leading up to the third SDS that these are the issues that stakeholders expect the Department to address. The contributions of the groups and individuals who participated in the consultations provided a valuable resource, and helped to focus the Strategy on achieving these four key results:

- *Canadians make better decisions that advance sustainable development.*
- *Canadians are taking action to reduce greenhouse gas emissions and adapt to the effects of climate change.*
- *Canada is globally recognized as a responsible steward of our natural resources and is a leader in advancing sustainable development internationally.*
- *NRCan demonstrates its commitment to sustainable development in its operations.*

These results form the focal points of the Strategy; turning vision into reality hinges upon achieving them. This discussion of sustainable development issues is organized under the four main tasks that NRCan must make progress on to effectively play its part in helping Canada achieve the four key results. Within each of the four areas there are significant challenges, but there are also new opportunities and the potential to make measurable progress towards the Department's vision.

The Challenges

Achieving the key results of the Strategy will require NRCan to take on challenges related to:

- Building a strong foundation for sustainable development by providing the knowledge, tools, and technology to support better decision making,
- Taking action on climate change, both to reduce greenhouse gas emissions and adapt to climate change impacts,
- Positioning Canada as a world leader on sustainable development, particularly in the natural resource sectors, and
- Demonstrating leadership and commitment to sustainable development at NRCan.

- **Building the foundation for sustainable development**

In order to make the choices that can advance sustainable development, it is essential to have the required information to support sound decision-making and the ability to use it. Building Canada's capacity for sustainable development is about improving knowledge and ability at all levels of Canadian society. Improving the knowledge base on Canada's landmass and natural resources, developing new tools and applications for monitoring and managing our resources, supporting advanced technology development, enhancing the capacity of communities to engage in sustainable development, and encouraging consumer choices that support sustainable development—all of these NRCan activities contribute to building Canada's capacity for sustainable development.

There are significant information gaps in the baseline knowledge that feeds decision making, both in Canada and abroad.

NRCan has a leading role in providing the increasingly comprehensive and integrated knowledge bases that are required for sustainable development decision making. As a world-class organization with a strong history of scientific excellence, NRCan will dedicate significant efforts to identifying and filling these knowledge gaps. For example, a national groundwater database and a national forest information system are under development.

There are important opportunities for industry, governments and universities to work more closely together to increase knowledge performance and the commercialization, transfer and adoption of its results. There is a significant need to enhance incentives and eliminate the obstacles that stand in the way of greater commercialization of Canadian innovations in the resource sectors and allied industries. Locating knowledge investments (both public and private) more systematically and strategically in regional clusters has the potential to generate significant benefits and encourage new spin-offs and innovation.

There are many indirect impacts associated with enhancing and integrating our knowledge bases, and expanding Canadian knowledge partnerships. These may include increased investment and new employment generation. In addition, promoting Canadian knowledge and experience in international markets can open the doors to new opportunities for Canadian companies and technologies, and build on Canada's reputation as a responsible steward of our natural resources.

More work needs to be done on the development and refinement of indicators for the resource sectors.

Sustainable development indicators can be generally described as a system of measures that provides a sound basis for decision-making and a means of measuring progress towards sustainable development. To be effective tools for advancing sustainable development, indicator sets must characterize the essential components of sustainable resource management in Canada. They must meet tests of scientific accuracy, be meaningful, and be able to convey readily understandable information to decision makers and the Canadian public. NRCan is actively working to expand and improve the use of indicators, within Canada's resource sectors and internationally.

Photo credit: Roberta Gal, Canadian Forest Service

A notable success is the Criteria and Indicators of Sustainable Forest Management, developed in partnership with forestry stakeholders under the authority of the Canadian Council of Forest Ministers (CCFM). Since 1993, the CCFM has developed and refined its criteria and indicators, publishing a technical report in 1997, establishing the Canadian baseline in the National Status 2000 Report, and reviewing and improving the relevancy of the indicators in 2003.

As well as supporting ongoing measurement and monitoring to identify national trends, the continuous evolution of indicators is itself a process that builds capacity by encouraging decision makers, stakeholders, and all Canadians to focus on priority issues. Indicator-based reporting can also have the effect of building capacity by raising public awareness and focussing attention on what sustainable development means.

Increases in efficiency alone will not be enough to meet Canada's sustainable development objectives; innovations in science and technology must provide solutions.

More than any other sector of the economy, the natural resources sectors and allied industries in Canada and globally are at the forefront of sustainable development. Industry has made important investments in innovations to improve environmental performance and their resource management practices. Despite these improvements, significant challenges remain, including Canada's international commitments under the Kyoto Protocol. Markets are increasingly demanding environmentally friendly products and processing, and social criteria such as labour practices and business ethics are increasingly considered as guides to investment and purchasing decisions. There is growing public awareness of sustainable development issues and their links to quality of life.

The natural resource sectors are major drivers of innovation, spending more than $34 billion annually on advanced technology and other capital investments (22% of Canada's total), more than any other industrial sector in Canada. NRCan has a unique role to play in providing the vision, coordination, knowledge and strong leadership needed to catalyze a more strategic approach to creating innovations with transformative potential.

For example, NRCan's Photovoltaic Research Group is working with its partners to develop and apply photovoltaic (PV) solar energy technologies in Canada. Their efforts aim to advance technology deployment in Canada, and improve the ability of Canadians to exploit the technology's potential nationally and internationally.

There is a need to increase understanding and uptake of sustainable development among small- and medium-sized businesses in Canada's resource sectors.

There is strong corporate leadership championing sustainable development approaches for Canada's resource sectors. However, there is an identified need to encourage a commitment to sustainable development among all businesses operating in the resource and allied industries. It will be essential to make and promote a strong business case for sustainable development; NRCan will support Canadian industry in this effort, and work to improve the mechanisms for effective dialogue among stakeholders.

Aboriginal communities, and small, northern and rural communities, often face unique and difficult development challenges.

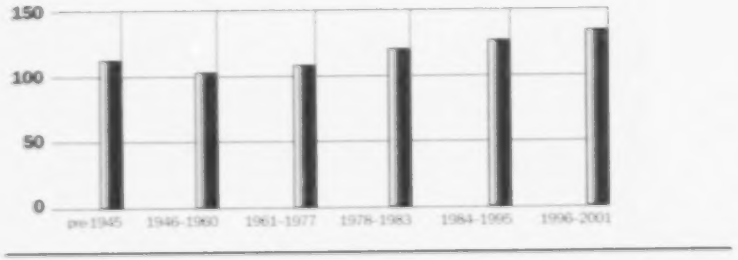
Canada has many small communities in rural or remote areas where the challenges to sustainable development are formidable. Some towns have had a long history of economic ups and downs, others have had to cope with the loss of a major employer or an entire industry; for some the social issues arising from economic uncertainty are urgent concerns. Communities in these situations often face similar issues: lack of a knowledge base and leadership capacity for decision making, an exodus of young people and skilled labour, high levels of unemployment, low incomes, and difficulty attracting development capital. Many Aboriginal communities face challenges similar to these, while also dealing with issues of natural resource access, management and land tenure on traditional lands, and struggling to gain respect for Aboriginal traditions, governance structures, language and culture.

In working to improve their quality of life, these communities need to create new and meaningful employment that will not threaten their future well-being. Many small communities have great potential for economic growth and diversification, including resource development. Improving their capacity to act as effective partners in resource development decision-making will increase the benefits to communities derived from the development of local resources. This can be an important step in building forward-looking communities with the confidence to address issues effectively and work towards a better future.

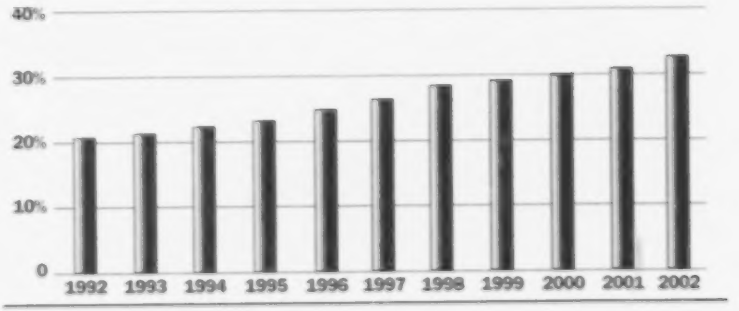
Canadians' understanding of sustainable development is increasing; yet this growing knowledge has not been reflected in consumer trends on the ground.

Opinion research has demonstrated that Canadians highly value environmental quality and are acquiring an understanding of the concept of sustainable development. However, trends in transportation and housing choices, and patterns of energy use, show that consumers are making choices that are not in line with emerging sustainable development goals (for example, decreasing urban sprawl, improving vehicle fuel-efficiency, increasing use of public transit, and reducing demand for electricity). The challenge for governments will be to develop a better understanding of this apparent contradiction, then take action to remove barriers and promote better consumer choices. It will be important to examine cost factors and assess the potential of economic instruments to encourage consumers to act in ways more compatible with sustainable development.

Average Size of New Housing Units by Construction Year (m^2/unit)



Light trucks as a percentage of Passenger Vehicle Fleet 1992–2002



Taking action on climate change

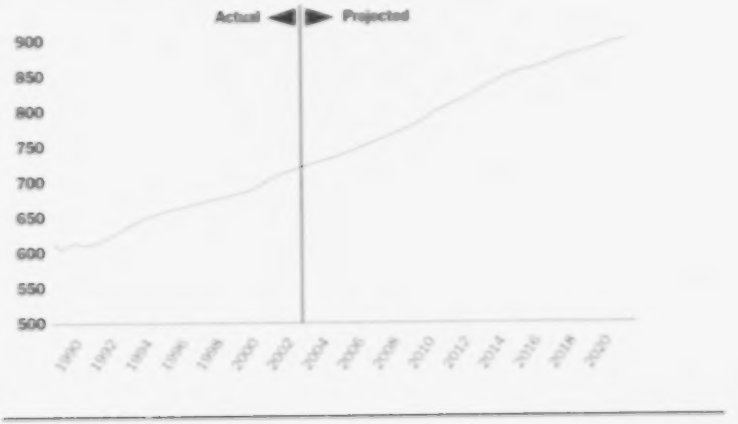
Climate change poses a threat to sustainable development, in Canada and globally. There is compelling scientific evidence that human activity, particularly activities associated with energy use and deforestation, is affecting the world's climate by accelerating the concentration of greenhouse gases (most importantly, carbon dioxide) in our atmosphere. There is general agreement that the Earth's average surface temperature will increase by at least 1.4 degrees Celsius by 2100, and possibly by as much as 5.8 degrees. The increase in average temperature will affect climate around the globe, including shifts in temperature, wind and precipitation patterns, and the frequency of severe weather events.

Canadians may already be feeling the effects of climate change, from hotter summers, to insect infestations in British Columbia's forests, to changing permafrost conditions in the North. While singular events, such as a heat wave, storm or forest fire, cannot be said to be *caused* by climate change, they can be interpreted as part of a pattern of increasing numbers of severe events, which is linked to climate change. Understanding climate change, and taking action to reduce emissions and adapt to the impacts we won't be able to avoid, are crucial to safeguarding the long-term well-being of Canadians.

To make progress towards meeting our international commitments, Canada needs to take action on many fronts.
Canada ratified the Kyoto Protocol in December 2002, making the commitment to reduce greenhouse gas emissions to six percent below 1990 levels by 2008–2012. However, the most recent 'business-as-usual' projections show that, if no action is taken, there will be a steady increase in greenhouse gas emissions for 2008–2012.

Taking action to mitigate climate change is a challenge for all Canadians. NRCan has been working to decrease Canada's greenhouse gas emissions since the early 1990s. These efforts contributed to the 1990s' trend towards increased energy efficiency in Canada. Between the negotiation of the Kyoto Protocol in 1997 and its ratification in 2002, the federal government introduced a series of measures aimed at enhancing our efforts to reduce emissions. Over that five years, $1.7 billion was allocated in activities such as climate science, mitigation measures, and technology development—many of these are under NRCan's responsibility.

'Business as Usual' 2010 Greenhouse Gas Emissions



The **Climate Change Plan for Canada** was developed to guide the Kyoto ratification decision. It proposes targeted measures to reduce greenhouse gas emissions in sectors such as housing, commercial and institutional buildings, and transportation. The approach also proposes targets for large final emitters (such as the oil and gas sectors, electricity generation, and mining and manufacturing), as well as a further investment in technology and innovation to help develop long-term solutions to climate change. In 2003, the Government of Canada announced new climate change funding of $2 billion to start implementing the approach over the next five years. A series of new mitigation measures are being introduced, along with a technology and innovation initiative. With this investment, NRCan remains at the centre of federal efforts to reduce greenhouse gas emissions.

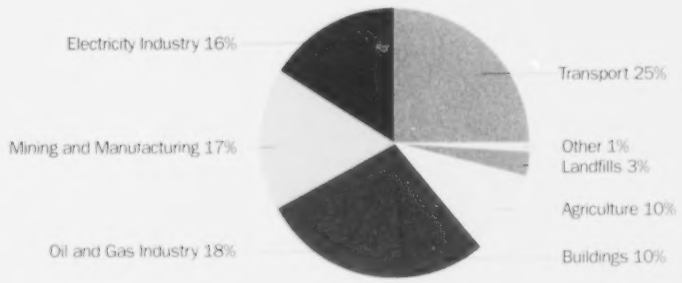
There are many side benefits of actions taken to reduce greenhouse gas emissions. Most of the options for increasing eco-efficiency also reduce pollution, improving air quality and the health of many Canadians. Advanced research and development on renewable and clean energy sources and assistance in bringing these solutions to market will increase their availability and use, creating new employment and export opportunities, enhancing the success of Canada's leading-edge businesses. Investing in research to further our knowledge of carbon storage in the environment

and innovative approaches to enhance carbon sequestration could lead to the development of unique world-leading climate change mitigation strategies.

Canada will see increasing environmental, social and economic impacts from climate change during this century; we need to be prepared. Even if Canada achieves its emissions reduction targets, the impacts of climate change will continue to be felt for many decades and adaptation will be required. While reducing emissions is essential to slow down the anticipated impacts and may reduce their severity, Canadians will still need to adapt to climate change. While concentrated efforts have greatly increased our understanding of the anticipated impacts of climate change, the process of building capacity in this relatively new, cross-cutting field (impacts and adaptation research) has just begun.

Collaboration among governments, academics, and the private sector, along with public participation and input, will improve Canada's ability to adapt to climate change. One of the key tasks will be to expand the assessment of vulnerabilities to climate change to all areas of Canada, particularly the North where a greater increase in average temperature is expected. NRCan has a coordinating role in advancing Canada's preparedness in this area, and a specific responsibility to enhance disaster response preparedness by providing knowledge and expertise related to natural hazards. For example, the predicted increase in heavy rainfall events could lead to a corresponding increase in the frequency of landslides, putting critical infrastructure at greater risk. Improving infrastructure resilience and enhancing disaster response preparedness in population centres makes Canadian communities stronger and safer. Accurate predictions of anticipated impacts may provide industries and communities with time to avoid some potential problems, make plans for effectively coping with others, and take advantage of new opportunities such as those provided by expanding forest ranges.

Greenhouse Gas Emissions by Sector, 2010



Positioning Canada as a world leader on sustainable development

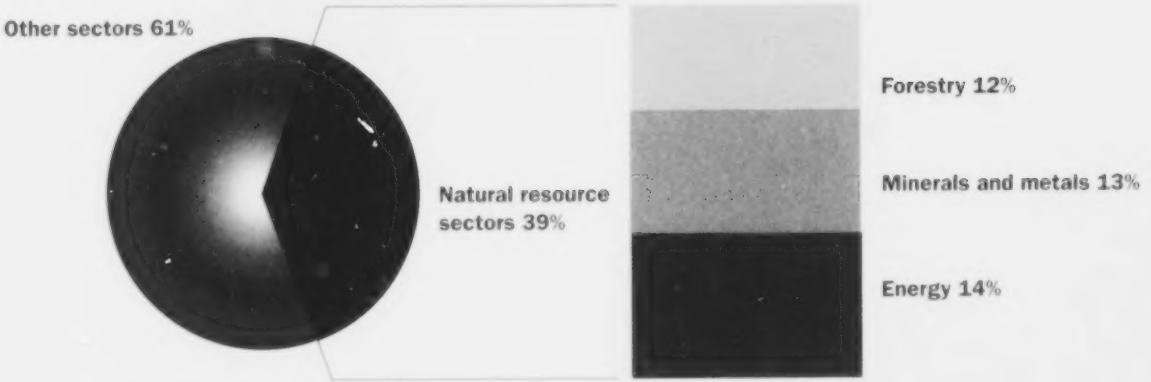
Natural Resources Canada has the federal responsibility to ensure the sustainable development of Canada's natural resources; however carrying out this mandate requires that we look beyond our borders. Addressing the global issues that challenge Canada's ability to create sustainable industries and communities requires both domestic action and our participation in developing international solutions in concert with the Departments of Foreign Affairs and International Trade (DFAIT) and the Canadian International Development Agency (CIDA), which have the federal lead for foreign policy and international development assistance, respectively.

Many key issues impacting sustainable development cannot be addressed by one country acting alone; global issues require international solutions. Canada is linked to the other countries of the world economically, socially, and environmentally. Our trade-dependent economy defines our prosperity in the context of global economic conditions and events. Imported environmental problems, such as acid rain and persistent organic pollutants, can damage our natural resources and impact the well-being of Canadians. Climate change poses significant threats to ecosystems and the health and safety of human populations worldwide. Our security is linked to regional inequities and conflicts involving countries that once seemed remote and unrelated to our national well-being.

It is clear that Canada has a stake in the sustainable development of the world, as well as a responsibility as a steward of significant natural resources. Further, Canada is a comparatively wealthy nation and a large per-capita resource user. It is in our best interest to adopt and implement sustainable development at home and promote it abroad. NRCan, with DFAIT and CIDA, plays a role in the development of international

standards, policies and agreements through its participation in sector-specific international organizations and fora, and engages in initiatives to share best practices and approaches supporting the sustainable development of natural resources internationally.

Natural Resource Sectors' Contributions to Exports, 2002



Regional inequities can create pressures leading to unsustainable social and economic development; it is in Canada's interest to assist developing countries in acquiring the capacity to develop their natural resources sustainably.

Poverty, political and social instability, and armed conflict can create intense pressures in the developing world to exhaust natural resources in order to finance conflict or meet immediate needs, or to proceed with ill-advised development projects which have long-term negative social and environmental consequences. The development and use of natural resources elsewhere can have detrimental effects on Canada's environment and economy, by adding to global environmental problems or affecting commodities markets in which Canada competes. In some cases there may also be security implications affecting markets and increasing costs to Canadian businesses. In developing countries enjoying relative social and political stability there may be knowledge gaps or economic barriers to sustainable development that can be overcome with assistance.

Through sharing knowledge and best practices, and engaging in projects where Canadian knowledge and expertise is applied—for example, resource mapping and mine-site rehabilitation—NRCan assists developing nations in gaining the capacity to plan for and implement sustainable development. These activities are often also opportunities for showcasing Canadian excellence and innovation.

On the policy front, Canada advocates the effective engagement of developing countries in international fora where trade, environment and the advancement of sustainable development issues are negotiated and fostered. Participating in international dialogue provides the opportunity to raise awareness of Canadian values internationally, promoting our commitment to sustainable development and supporting the development of other countries, particularly those with significant economic activity in their natural resource sectors.

There are existing barriers to the international trade of natural resource products that negatively impact Canada's economy.

NRCan's commitment to the sustainable development of Canada's natural resources includes optimizing social and economic benefits for Canadians while exercising environmental stewardship. Canada exports approximately $150 billion worth of energy, minerals and forest products every year, accounting for almost 40 percent of our exports. Trade barriers that deny Canadian products access to international markets are serious issues for Canada. Trade barriers deny opportunities to Canadian exporters, preventing Canadians from enjoying the benefits that could be derived from international trade of natural resource products. Denying industry sectors access to revenues from foreign trade can also result in slowing progress on innovation.

Some trade barriers are raised based on assessments which find that Canadian products are not suitable for importation based on selective environmental/social criteria. NRCan has an important role in investigating and assessing such findings. In some cases, taking specific actions

in response to external criticism may be required. For example, the International Forestry Partnerships Program (delivered with DFAIT), an initiative of the Canadian Council of Forest Ministers, was created to counter widely publicized incomplete and biased information about Canada's sustainable forest management policies and practices disseminated in Canada's key export markets by environmental non-governmental organizations.

Canada's natural resource industries are aggressively pursuing sustainable development and NRCan is supporting the private sector in this effort, but the journey is not over. As actors in international markets where there are few agreed global standards, but a great deal of criticism, Canadian governments and industry must work together to address criticisms levelled against Canadian products or producers.

Demonstrating leadership and commitment to sustainable development

As a federal department involved in both targeted and multi-stakeholder consultations on sustainable development and related issues, the Department fields many enquiries about the state of sustainable development at Natural Resources Canada. Representatives of the Department are often asked about what NRCan is doing to implement and maintain sustainable development in its operations. This is a fair question. To inspire Canadians to work towards sustainable development, the federal government must demonstrate leadership and commitment in its own operations.

To promote sustainable development effectively, government must be able to demonstrate that its own house is in order.
NRCan has a mandate to promote the sustainable development and responsible use of our nation's natural resources. In addition, the Department is advancing a vision in which Canada's natural resource sectors and allied industries are world-leading models of sustainable development. In order to effectively carry out its statutory responsibilities and successfully promote its vision for the future, the Department must be able to lead with authority and credibility. For these reasons, internalizing the principles of sustainable development at NRCan is a departmental priority.

There is a need to improve the information that can demonstrate progress on sustainable development objectives.
Stakeholder consultations have consistently pointed out that industries, non-government organizations and the Canadian public would all like to see government commitments to sustainable development backed up by firm figures that demonstrate progress towards well-defined, measurable targets. This does not apply solely to government operations, but it does apply here specifically in the context of demonstrating the federal government's commitment to sustainable development.

NRCan is the co-champion of Sustainable Federal House in Order, an initiative designed to identify and coordinate opportunities to integrate the principles of sustainable development into the day-to-day activities of the federal government, in keeping with the Government of Canada's commitment to demonstrate leadership on sustainable development. An important part of this work is further refining performance measurement and endeavouring to achieve more comprehensive reporting on operational performance, which will enhance government transparency and accountability, while demonstrating leadership on sustainable development.

Within its own house, NRCan is working to achieve its goals by integrating economic, environmental and social-growth opportunities into day-to-day practices. The term 'corporate social responsibility' (CSR) is being used by a growing number of private- and public-sector organizations to describe an organization's overall commitment to meeting stakeholder expectations on economic, environmental, social and governance performance. Moving beyond environmental performance, CSR is generally understood to be the way an organization achieves a balance or integration of economic, environmental, and social objectives. By endeavouring to continuously improve the implementation of sustainable development principles within its operations and integrate the tenets of corporate social responsibility throughout the organization, NRCan is striving to become a model department, leading the way within the federal government.

IV: Approach

Moving Forward is an action plan geared to realizing the Department's long-term vision. Turning the vision into reality depends upon achieving *four key results*. These results, and the issues that threaten Canada's ability to achieve them, are identified in Section III, The Issues. The contributions of stakeholders who participated in the consultations leading up to the third SDS (see Appendix 2) assisted the Department in arriving at its vision and the key results which have become the Strategy's local points.

Progress towards the vision will be assessed through the evaluation of the steps taken to achieving the four key results, best described as 'mileposts' on the journey towards NRCan's long-term vision. They are intended to describe the specific results that NRCan is best positioned to address, although they are not achievable by NRCan alone. A number of **metrics** for tracking progress are identified for each key result; some are specific to NRCan, others broader. NRCan has identified a series of commitments aimed at achieving these results. For purposes of the Strategy, these are categorized as departmental **actions**. These actions, in turn, are advanced by specific, measurable **targets**.

Reading the tables

The **summary chart** that follows illustrates the linkages between the issues, the key result they relate to, and the actions the Department is planning to take during the period of the third Sustainable Development Strategy. Included in the column featuring the key result is a list of the metrics that will be used to measure the Department's progress. Each of the actions found on the summary chart is expanded in the tables that form the central part of the Strategy. There is one section for each key result, introduced by a overview of the Department's role in achieving the result.

The **action tables** follow a consistent format, with the action listed across the top and the individual items described in the body of the table. Reading the columns across from left to right shows a progression from a description of the specific issue, to NRCan's approach to addressing the issue, to the specific, measurable target that will be achieved within the timeframe of this SDS, to the anticipated outcome of the activity. In some cases, related items have been presented as one action item, in other words, as a single row in the action table.

Identifying NRCan's core competencies

The stakeholder consultations also helped NRCan to define the Department's **core competencies for sustainable development**. Discussion on the issues led to a better understanding of *what* stakeholders expect the Department to address; discussion of *how* NRCan is positioned to do this led to the emergence of three key competencies. These competencies, or strengths, of the Department are the three areas where NRCan is viewed to be well-positioned to make a significant contribution to sustainable development. Agreement on these points was consistent throughout the consultations.

First, it was widely agreed that NRCan is a recognized expert in the development and provision of **tools and applications** to improve our understanding of Canada's natural resources and to help Canada to optimize the value and contribution of resources to sustainable development. The need to build, apply and share **best practices and models** for resource stewardship was also consistently conveyed in each of the sessions, with stakeholders acknowledging that NRCan is well positioned to continue making advances in this area. Finally, NRCan was encouraged to work with stakeholders (including governments, industry and communities) to ensure appropriate **policy and governance** for sustainable development at home and abroad.

These core competencies are essentially the 'how' of the strategy. The icons in the box below illustrate each of the core competencies. They are used throughout the document to identify which of these core competencies are at work for each of the actions.

Tools & Applications	Best Practices & Models	Policy & Governance

Reporting our progress

Together, all of the elements described above, form the basis for the architecture of *Moving Forward*. The Strategy is grounded in the Department's Planning and Reporting Accountability Structure (see Section VI). The five strategic outcomes and associated objectives provide the foundation for the Sustainable Development Strategy, ensuring credibility and accountability.

SD-AIMS, the Department's Sustainable Development Action Items Management System, is a Web-based tracking and reporting tool that enables timely and accurate reporting of progress and performance on NRCan's Sustainable Development Strategy action commitments.

Moving Forward follows the path established in previous strategies by remaining grounded in the Department's five strategic outcomes, but it also sets out in a new direction by establishing focussed priorities—essentially, the 'transformative pieces' where NRCan can make this Strategy the change-management tool necessary to support the shift towards sustainable development.

Summary Chart

Issues

- Significant information gaps exist in the baseline knowledge that feeds decision making
- More work is needed on the development and refinement of sustainable development indicators for the resource sectors
- Increases in efficiency alone will not be enough to meet our sustainable development objectives—S&T must provide new solutions
- Small- and medium-sized enterprises in the resource sectors need to increase their understanding and uptake of sustainable development
- Aboriginal, northern, rural and remote communities face unique and difficult sustainable development challenges
- Canadians understanding of sustainable development is increasing, yet this is not reflected in consumer trends

- Canada needs to take action on many fronts to reduce greenhouse gas emissions, in order to make progress towards meeting international commitments
- There will be increasing environmental, social and economic impacts resulting from climate change—Canada needs to be prepared

- Many key issues facing sustainable development cannot be addressed by one country acting alone—global issues require international solutions
- Unsustainable resource development abroad can negatively affect Canada—it is in Canada's interest to build sustainable development capacity abroad
- Barriers to international trade of resource products negatively affect Canada's economy

- To promote sustainable development effectively, government must have its house in order
- There is a need to improve the data that can demonstrate progress on sustainable development objectives
- This is an opportunity to lead by example

Key Results	Actions
1) Canadians make better decisions that advance sustainable development **As evidenced by:** • increased individual, community and organizational capacity • increased public stewardship (e.g. participation in recycling programs) • increased participation in decisions about land and resource development/use • increased skills and employment opportunities • maintained/increased economic contribution of natural resources to GDP • increased investment in natural resource sectors and allied industries • increased effectiveness of regulation and efficiency of regulatory processes • increased multi-stakeholder dialogue	1.1 Provide knowledge and decision-support tools for resource decision-makers 1.2 Undertake science and technology and develop strategies to advance resource stewardship 1.3 Increase understanding of water resource supply and minimize impacts of natural resource sector activities on aquatic ecosystems 1.4 Apply, support and share best practices and models 1.5 Support policy, dialogue and governance to increase the contributions of Canada's resource sectors to sustainable development 1.6 Engage Aboriginal communities in sustainable land and resource development and use 1.7 Facilitate skills development and increase public outreach
2) Canadians are taking action to reduce greenhouse gas emissions and adapt to the effects of climate change **As evidenced by:** • decreased emissions of greenhouse gases and pollutants • improved energy efficiency • increased production and use of renewable energy • increased levels of resource recovery and recycling • increased deployment of eco-efficient technologies • increased understanding of Canada's vulnerabilities to climate change impacts • increased development and application of targeted adaptation strategies, plans and actions	2.1 Advance policy and dialogue to address climate change 2.2 Achieve emissions reductions through energy efficiency, renewable and alternative energy, and carbon sequestration 2.3 Establish greenhouse gas emissions reduction targets for key industry sectors 2.4 Undertake science and technology to reduce greenhouse gas emissions, and improve Canada's ability to further mitigate and adapt to climate change impacts
3) Canada is globally recognized as a responsible steward of our natural resources and is a leader in advancing sustainable development internationally **As evidenced by:** • maintained or increased market access for Canadian resource products and producers • increased investment in Canada's natural resource sectors • increased use of voluntary stewardship initiatives by resource sectors • increased recognition of the importance of natural resources to sustainable development • increased international dialogue related to sustainable development within the natural resource sectors	3.1 Address issues related to resource access within Canada, and international market access issues concerning Canadian natural resource products and producers 3.2 Forge partnerships for advancing the contributions of natural resource sectors to sustainable development internationally 3.3 Promote best practices for sustainable development abroad
4) NRCan demonstrates its commitment to sustainable development in its operations **As evidenced by:** • implementation of an environmental management system • management of emissions and effluents • reduced energy consumption/greenhouse gas emissions • reduced water consumption • sustainable land use	4.1 Improve NRCan operations through sound environmental management 4.2 Develop and implement further strategies to improve resource use efficiency and reduce greenhouse gas emissions in NRCan facilities

V: Commitments

Key Result 1: Canadians make better decisions that advance sustainable development

Turning NRCan's vision into reality depends on improving decision making at all levels of Canadian society, so that social, economic and environmental considerations are thoroughly integrated in decision-making processes. Building capacity is about creating the conditions for advancing sustainable development by improving our ability to make better decisions. It is the foundation for sustainable development. For NRCan, the focus is on decisions made about resource development and use.

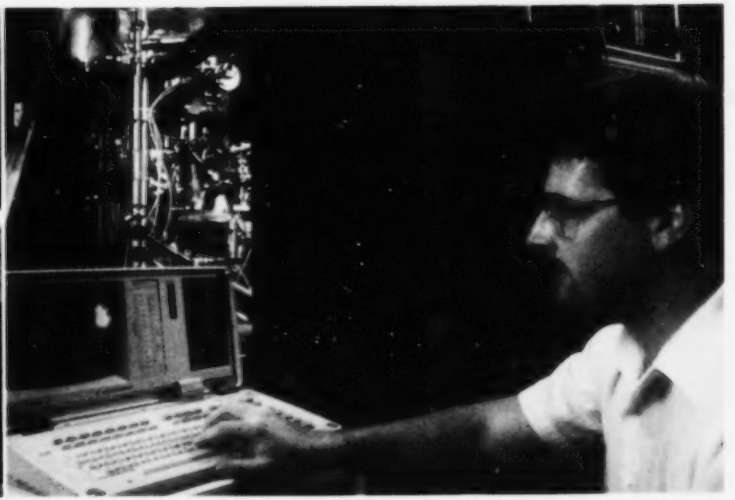
Sound decision-making requires the support of comprehensive, integrated, and available information. NRCan is constantly working to improve Canada's knowledge bases related to the natural resource sectors. NRCan also contributes to the development of knowledge in other areas crucial to sustainable development, for example, by mapping seafloor data for better ocean management. Better science and improved knowledge bases must be linked to functional tools for decision makers in order to support sustainable development. NRCan is dedicating significant effort to providing integrated and accessible data, coupled with decision-support tools that enable planners and resource managers to make better decisions. Assessment and

evaluation tools are required to ensure that the decisions made effectively deliver the expected results.

Capacity building must also include consideration of human resources. The social component of sustainable development indicates a need for the informed participation of all stakeholders in decision making about natural resources development. This may include several governments and businesses, affected communities, non-government organizations, and concerned citizens. NRCan works to improve the capacity of all Canadians to be informed participants in decision making about resource development and use, for example, by working with resource industry leadership to promote sustainable development within the private sector, by helping communities to develop the tools and skills they need to improve decision making for resource management, and by providing public information about Canada's natural resources and sustainable development.

Better science, integrated and accessible data, assessment and evaluation tools, technology innovation, informed leadership, outreach and education—these are priority action areas for NRCan because knowledge and ability, together with commitment, create the conditions under which sustainable development can take place. NRCan also has a role to play in shaping the regulatory environment that governs resource development and use in Canada, fostering dialogue and contributing to the evolution of government policy that supports sustainable development.

Building capacity to support sustainable development in Canada includes a host of activities within all sectors of the Department, related to all of Canada's natural resource sectors, and addressed to diverse audiences that include governments, communities, the private sector, and all Canadians. What groups all of the actions described in this section is their common purpose: creating the conditions for advancing sustainable development in Canada.



Action 1.1: Provide knowledge and decision-support tools for resource decision-makers

Issue	Approach	Target	Anticipated outcome
Stewardship of Canada's forests requires comprehensive monitoring and reporting of forest management activities as well as the state of forest resources themselves. There is a need to address information gaps, such as the nature and rate of changes to the resource and information on non-timber vegetation. Remote sensing tools can assist with data gathering in hard-to-access locations. A variety of audiences require this information—from federal and provincial/territorial subject area specialists and policy analysts to national and international publics.	To address these information gaps, NRCan will provide current data on the size, composition and state of Canada's forests. The National Forest Information System will provide ready access to and transparent integration of information held by the custodial agencies across the country, through use of international standards and sharing of information technology. The National Forest Inventory is a plot-based system of permanent observational units located on a national 'grid.' Remote sensing tools will gather data on the forest area and its characteristics, which can be used to enhance forest inventories and to extend inventories to areas that currently are not or are only poorly covered as well as detecting forest changes and land-use change. The National Forestry Database Program complements these initiatives by providing a framework for reporting on the extent and nature of Canada's forests and their management.	By 2004, initiate the deployment, in increments, of the National Forest Information System. By 2005, complete initial establishment of the National Forest Inventory. By 2006, initiate 5-year re-measurement cycle for photo/satellite plots and a 10-year re-measurement cycle for ground plots. By 2006, develop products from remote sensing tools and methods.	Current, reliable, consistent, multifaceted information about a wide range of social, economic, and ecological values, as well as the ability to monitor changes over time. A standardized national system to report on national and international commitments (including carbon budget modelling), track progress toward sustainable forest management at the national level, and provide public access to nationally relevant forest information. Improved ability to effectively report on its forest practices and sector, enhancing the credibility for Canadian forest management practices and products, bolstering Canada's position in international fora, and improving public access to information.
Woodlots, often located in close proximity to urban areas, provide a host of non-timber benefits to society (water and air quality, aesthetic, wildlife habitat). Woodlot owners provide a host of services, at a cost, through sustainable forest management on woodlots. These benefits are often not recognized by society, and do not have monetary value. Woodlot owners, municipal and other levels of government, general public require information on these benefits.	NRCan will expand the current knowledge and awareness of the contribution of sustainable forest management on woodlots to society. This initiative follows recommendations put forward at the series of cross-Canada workshops on woodlots held by Canada's Model Forest Program, and is part of a coordinated series of projects of the Private Woodlot Strategic Initiative of the Canadian Model Forest Network.	By 2004, develop report describing contributions of woodlots to society. By 2006, develop report providing a quantitative valuation of benefits.	Municipal, provincial, and federal government policies and legislation will take into account the multiple benefits that society gains from non-market forest products produced by woodlots. Woodlot owners will then be able to maintain their non-market contributions to the quality of life of Canadians.

Issue	Approach	Target	Anticipated outcome
Conservation of forest biodiversity is one of the criteria defining sustainable forest management, both in Canada and internationally. Criteria and indicators reporting requires monitoring the trends and status of species at risk, alien invasive species and other selected species associated with forests in order that forest practices can be adapted to appropriately manage these species. However, the degree of forest dependence for these species has not been determined.	NRCan will develop a framework for reporting on forest-associated species, in partnership with other government departments and agencies and provinces/territories, to compile common databases on forest associated species at risk, alien invasive species and species of special significance. The databases will be accessible through the Canadian Biodiversity Information Facility and the National Forest Information System and available for use by the Committee on the Status of Endangered Wildlife in Canada.	By 2004, complete an initial component of the database on alien invasive insects (Scotylidae) with bioclimatic modelling capacity. By 2004, hold a workshop to bring together partners. By 2005, develop a database on forest-associated species at risk. By 2006, complete additional components of the database on alien invasive species.	**Creation of a national framework and process for assigning forest dependence.** **Improved ability to report on criteria and indicators.** **New tools to improve risk assessments of alien invasive species (Scotylidae).**
A wide range of stakeholders, including the federal, provincial and territorial governments, industry and communities, rely on statistical information describing all aspects of mineral activity in Canada. Availability of timely and accurate information will promote sound decision-making on the sustainable development of Canada's mineral resources.	NRCan will collaborate with stakeholders to efficiently collect and share knowledge and statistics on all dimensions of mineral activity in Canada and to disseminate this information to Canadians. NRCan will develop Internet-based applications to ensure efficient collection and dissemination of statistics on economic (production, trade), social (regional employment) and environmental (recycling) aspects of Canada's minerals and metals activity.	By 2004, develop a series of customized Web sites allowing direct access to statistical information, in collaboration with provinces and territories. By 2004, verify that historical trade and mine production statistics are of the highest quality and accuracy. By 2006, verify mineral exploration expenditures and use data.	**Accurate and timely statistical products to improve decision making by all levels of government, by industry and by Canadians in relation to Canada's mineral and metal resources.**
An ecosystem approach is holistic and addresses economic, social and environmental considerations. The Convention on Biological Diversity outlined 12 principles for the ecosystem approach to integrate its three objectives of conservation, sustainable use and benefit sharing. However, no clear definition of ecosystem-based forest management exists, and its implementation remains the object of national and international debate. While implementation of both the Convention on Biological Diversity and the National Forest Strategy are based on an ecosystem approach, little guidance exists.	NRCan will examine the Canadian experience with implementation of the ecosystem approach and provide a synthesis of current status, by consulting with industry on the current status and capacity to fully adopt an ecosystem approach to forest management. NRCan will also assess scientific and technical tools currently available that would be required to implement ecosystem management of forest lands. Partners involved will include the forest industry, non-government organizations, provinces/territories, academia and other federal government departments and agencies (particularly Parks Canada Agency, Environment Canada, Canadian Food Inspection Agency, Agriculture and Agri-food Canada).	By 2004, complete an evaluation of the status of ecosystem-based forest management in Canada. By 2005, complete a report on the ecosystem approach and its relationship to sustainable forest management. By 2006, hold a workshop to review the evaluation and report, and to identify opportunities for partnerships to implement an ecosystem approach to sustainable forest management.	**Improved understanding of the ecosystem approach as it pertains to sustainable forest management.** **An overview of present status of and capacity for implementation of ecosystem approaches in Canada.** **Guidance for implementation of ecosystem-based approaches to sustainable forest management.**

Issue	Approach	Target	Anticipated outcome
There is a need among all levels of government, the forest sector, non-government organizations, Aboriginal organizations, the global forest market and Canada's public for information, knowledge and capacity to use the nationally and internationally accepted tools and methodologies to measure indicators of sustainable forest management. To achieve global recognition that Canada indeed manages its forests in a sustainable manner, Canada must measure the state of sustainability of its forest management, using impartial, widely-accepted, science-based tools.	NRCan will be proactive in working with other interested working groups, councils and committees to develop common protocols to obtain, manage and report on data for indicators of sustainable forest management. This initiative contributes to sustainable development by ensuring that there is consistency in the methodologies and the data types that are collected and used to illustrate the social, economic and environmental dimensions important in the measurement of progress towards sustainable forest management. Other partners directly involved include all levels of government, the forest industry, non-government organizations, Aboriginal organizations and the global forest market. Canada's public is involved indirectly.	By 2004, coordinate discussions among partners with a view to refining the tools and methodologies to measure indicators of sustainable forest management. By 2004, conduct discussions with international partners aimed at further refining and harmonizing Montreal Process indicators and Canadian Council of Forest Ministers indicators of sustainable forest management.	An inclusive, collaborative, coordinated, efficient and effective approach in developing the tools and methods necessary to measure indicators of sustainable forest management among interested parties in Canada. A common understanding of the challenges of developing the tools and methods. Increased efficiency in resource allocation to meet the objectives and approaches taken by various organizations to create the tools and methodologies.
The Government of Canada is committed to better connecting to its citizens. As its contribution to this objective, NRCan has a responsibility to improve and increase the electronic dissemination of its natural resources data, information and knowledge to help Canadians make better decisions about sustainable development. Decisions for areas such as natural resource development, strong and safe communities, Aboriginal issues, and development of the North.	NRCan will make its geospatial information available online to clients. This includes key geospatial information products, such as digital topographic and freely available framework data, and online national maps. Clients comprise three groups: citizens; experts/scientists and private sector; and all levels of government partners.	By 2004, provide free access to accurate, consistent, current online national maps. By 2005, provide tools to allow simple inclusion of national maps in any Government of Canada Web site. By 2006, deliver online national maps to citizens through a number of Government of Canada Web sites.	Increased availability of online national maps. Improved online access to NRCan geospatial information products through consistent procedures and licensing. Increased confidence among users resulting in better decision-making, informed by geospatial information products.
Canada is the second largest country in the world. There is a need to better understand the content of the landmass and infrastructure. This in turn creates a need and an opportunity for NRCan to continue to upgrade its key tools such as geospatial data, maps and satellite imagery.	NRCan is recognized as a leading contributor to the national framework of digital geospatial data. NRCan will provide quality basic geospatial information and knowledge to decision makers involved in resource stewardship and management through both traditional and new sources of data and information, as well as expanding the use of delivery methods such as the Internet. NRCan will produce and maintain information in a common technological environment in partnership with other data producers.	By 2006, complete Canadian coverage of basic geospatial information layers (geographical names, atlas thematic frameworks, transportation networks and satellite ortho-imagery) will be produced and upgraded periodically. By 2006, Canadian coverage for elevation data and hydrographic network layers will be 60% complete.	More efficient and effective decision-making by communities, industry and policy organizations involved in sustainable development of natural resources.

Issue	Approach	Target	Anticipated outcome
There is a need to attract investment, to develop the skills and capacities of Canadians, and to create work opportunities in rural, remote, northern and Aboriginal communities. To improve the way Canadians make decisions about their land and resources development to provide benefits for the present without compromising the well-being of future generations, NRCan will continue to support sustainable development and investment in Canada's North through the use of geospatial information.	NRCan will support development and investment in the North that is consistent with sustainable development by providing reliable, and consistent geospatial information, well-defined property rights, and by providing assistance to develop capacity in northern governments and communities. NRCan and its partners will provide consistent, reliable and distinct user-defined northern geomatics information.	By 2006, provide base geospatial information and earth observation imagery. By 2006, operate a legal survey system in support of the extent of property rights. By 2006, provide access to a national geodetic reference frame. By 2006, develop techniques and methodologies to portray and integrate geospatial information. By 2007, complete conversion of map-based geospatial products to digital environment in order to permit digital image and cartographic mapping, seamless integrated databases, real-time mapping and print-on-demand.	Better quality and efficiency in land-based decision-making regarding natural resources and environmental management by northern communities, private enterprise and governments. Increased private investment in natural resource development, consistent with the principles of sustainable development. Informed land-based economic development in Canada's North.
Federal, provincial and territorial governments, industry stakeholders and environmental groups need an internally consistent estimate of Canada's greenhouse gas emissions up to the end of the Kyoto second commitment period.	NRCan will prepare a consensus forecast of energy supply, demand and prices with the associated greenhouse gas emissions. The document will be a projection of Canada's energy supply and demand to 2020. It will also provide the greenhouse gas emissions associated with energy production, conversion and consumption. The underlying assumptions (e.g. economic growth, economic structure, demographics and world oil price) are important building blocks. Therefore, it is important that consultations be held within the federal government and with the provincial and territorial governments to develop a consensus view on these assumptions.	By 2004, complete a forecast providing a benchmark of emissions and energy use for governments and stakeholders.	A reference document from which governments and stakeholders can measure the impacts of sustainable development policy and other energy policies.

Action 1.2: Undertake science and technology and develop strategies to advance resource stewardship

Issue	Approach	Target	Anticipated outcome
Extensive client consultations demonstrate an urgent need for geoscience knowledge to ensure that natural resource development does not harm the ocean environment and that land-use decisions balance social, economic and environmental considerations.	NRCan will deliver the geoscience knowledge base for informed decision-making in Canada's offshore lands. To this end a mapping strategy will be developed that will develop and define common methods and standards for use in other related projects.	By 2005, develop a National Seafloor Mapping Strategy in conjunction with federal partners.	A foundation for integrated sea-floor mapping which will lead to industry proposals (based on appropriate seafloor map data) to mine offshore resources.
Alien invasive species affect the environment, including through modification of ecosystem processes and displacement of native species. Social and economic aspects of these problems include the impacts on resource quality and availability, the potential to export products and the disruption of employment and infrastructure. Entry, establishment and spread of exotic pests, as well as their impacts, is difficult to predict. The efforts required to deal effectively with these issues are costly, and coordination is essential for success. The Canadian Food Inspection Agency (CFIA) is the federal lead organization on phyto-sanitary matters. NRCan provides vital forest science expertise.	NRCan will develop a national strategy to detect new arrivals before they can get a foothold in Canada's forests, becoming a threat to the forest resources, potentially causing problems for Canada's export markets. NRCan, in partnership with CFIA, will address the biology of exotic species, risk assessment needs, and potential control measures. This project will benefit urban as well as rural forested areas. Many agencies are involved: provincial natural resources and environmental ministries, municipal forestry and public health agencies, other federal departments (Pest Management Regulatory Agency, Fisheries and Oceans, Revenue Canada, Department of Foreign Affairs and International Trade).	By 2005, NRCan will develop a national strategy on forest alien invasive species, integrating environmental, economic and social risks, in partnership with Environment Canada and the Canadian Food Inspection Agency.	Enhanced supporting research for policy development in controlling invasive species. Enhanced capacity for gathering and synthesis of information on potential exotic forest pests. Improved assessments of potential impacts of exotic pests on forests, municipalities, trade, and biodiversity. Enhanced mitigative and preventive measures against exotic pests.
Responsible development of mineral and energy resources will be the basis for economic development and will improve the quality of life for northern Canadians, most of whom are First Nations or Inuit. The present state of the geoscience knowledge base is not sufficiently developed to support the exploration for resources that is required to move the economy of the North ahead.	NRCan will create and effectively market new, comprehensive, regional mineral and energy geoscience products (regional databases, maps, reports) to stimulate private sector investment in exploration and development in areas of high geological potential. The Department will also contribute to the building of the knowledge, skills and capacities needed by northerners to meaningfully guide and participate in this development.	By 2007, develop predictive models for hydrocarbons of prospective northern basins and all known mineral deposit types over 15% of the North.	Improved resources to assist northern Canadians in attaining economic self-sufficiency, social stability and improved quality of life by contributing to the creation of employment opportunities in their communities and to the building of their capacity to participate.

Issue	Approach	Target	Anticipated outcome
It is anticipated that Canada and the world will continue to utilize metals in our environment. For the safety of Canadian health, geoscience knowledge is essential. International organizations such as the Arctic Council, which administers the Arctic Monitoring and Assessment Programme depend on this geoscience.	Risk-management decisions, taken in accordance with the federal Toxic Substances Management Policy, need to encompass protocols that distinguish concentrations of metals in the environment that are primarily anthropogenic from those that are natural in origin. NRCan will provide geoscience knowledge for the assessment and management of health risks posed by metals in the environment.	By 2005, provide input on natural geochemical backgrounds to federal and provincial policies on water quality and on Canada-wide mercury standards. By 2006, provide input to the Arctic Monitoring and Assessment Program report on metals in Arctic environments, including protocols on differentiating metal concentrations derived from anthropogenic and natural sources, and assessments of historical metal accumulation.	Integration of geoscience knowledge into risk management decisions, reducing adverse effects on human and environmental health from toxic metals in the environment.
Canadians are the highest users of energy per capita in the world. Climate change, energy security and reliability and other environmental issues associated with energy production, conversion and use require science and technology for solutions to improve the performance of the energy sector in contributing to sustainable development.	NRCan will conduct research and development to develop a knowledge base, and to develop and demonstrate a range of transitional technologies in areas that include clean coal, distributed generation, efficient buildings and communities, bio-based energy systems, advanced energy efficiency in transportation and industry, clean fossil fuels production, and hydrogen-based energy systems.	By 2006, achieve an annual overall efficiency of 75% in local power generation systems through advances to increase the percentage of the residual heat that is produced along with the generation of power. By 2006, achieve a reduction of 10% in the costs for renewable energy systems in off-grid communities, coupled with a 10% reduction in the use of conventional fuel in the communities. By 2006, achieve more efficient conversion of fossil fuel to electricity, with ultra-low environmental impacts, as demonstrated by the development of two prototype intelligent systems.	Knowledge for decision making, regulation and risk management, energy technology solutions and opportunities. Progress on addressing long term knowledge gaps. Potential technology solutions to address a wide variety of sustainable development challenges.

Action 1.3: Increase understanding of water resource supply and minimize impacts of natural resource sector activities on aquatic ecosystems

Issue	Approach	Target	Anticipated outcome
Close to nine million Canadians rely on groundwater. This number is constantly growing, yet our understanding of how much groundwater is available for use in Canada, is limited. There is a need for governments (municipal, provincial and federal) to better understand the quality and quantity of existing groundwater resources and the dynamics and vulnerability of key regional sources.	NRCan will focus on determining the extent of the most strategic regional groundwater resources. NRCan will also develop methods for assessing the vulnerability of groundwater resources to land use and climate change. The emphasis of this initiative will be on the synthesis of existing data, as well as resource characterization of aquifers with critical dependencies for human use, agriculture and/or industry.	By 2006, map 20% of key regional aquifers. By 2006, complete current regional projects, to standards proposed by the Canadian Framework for Collaboration on Groundwater. By 2006, produce maps of natural quality of the groundwater of regional aquifers. By 2006, establish national database on groundwater. By 2006, establish and implement approaches for assessing the impact of land cover and climate change on groundwater.	Improved knowledge of key regional groundwater resources in Canada. Identify aquifers at risk and aid municipal government to plan related to water and waste management issues.
Canada has the third largest resource of fresh water globally. Yet the majority of Canada's water use is found in areas away from the major population centres. At issue is the impact of climate change on the balance of water supply and demand at regional and national scales.	NRCan will assess Canada wide land surface water budget through a combination of earth observation data, numerical simulation models and observed and modelled climate data. Earth observation will also be applied to provide Canada wide maps of snow cover on a daily basis by processing archival and current satellite imagery.	By 2006, complete the Canada Water Accounts of annual sub-sub-basin water budgets under current and projected conditions. By 2006, a record of current and historical snow cover trends over Canada from 1985 onwards.	Canadians have information that helps them to better plan adaptation responses. Governments make use of snow cover trends to assess fire danger levels and impacts of snow cover changes on water availability for in-stream and consumptive use.
According to climate change scenarios, the Prairie region will become even drier than now. The ability of biophysical systems to adapt to change, the human capacity of adaptation, the need for additional water resources as an option for adaptation are under question—as well as the policy and program options to address these issues.	NRCan will use an integrated assessment and modelling approach to address these issues, in collaboration with other government departments and the University of Saskatchewan, using NRCan's capacity in glacier monitoring, biophysical systems monitoring and modelling, and spatially-explicit modelling and simulation, and using an integrated assessment and modelling approach.	By 2006, produce an assessment of costs of climate change and water resource impacts to Prairie agriculture and economy. By 2006, develop an integrated assessment framework that can be used to test scenarios of the costs under different climate change and socio-economic assumptions.	Prairie provinces have information to assist them with adaptation decision-making.

Issue	Approach	Target	Anticipated outcome
The production of oil and gas can be a highly consumptive use of fresh potable water. Conventional oil water flooding and water withdrawal from the Athabasca river for oil sands development are two examples. Recent oil sands announcements have led some to question the ability of the Athabasca River to meet the projected increasing demand for water. Prolonged and more periodic drought conditions can further exacerbate the challenges which lead to a very difficult allocation of potable surface and near-surface water rights between the conventional oil water flooding industry, other industrial groups, agriculture and community/residential users.	NRCan has developed a number of science and technology initiatives dealing with water use in oil and gas production. At its research lab in Devon, Alberta, NRCan is active in surface mined oil sands extraction and tailings research focussed on increasing recycled water use to reduce fresh water demand. NRCan is also actively encouraging other government departments as well as provincial, academic and private-sector interests to pursue less water-intensive oil and gas technology developments.	By 2004, establish the Oil Sands Tailings Research facility, with a focus on tailings and water management. By 2004, establish a multi-year research program on 21st century conventional oil water flooding technology development.	Enhanced stewardship, and reduced intensity of fresh potable water use in oil and gas production, particularly oil sands development and conventional oil production by water flooding.
There is a need to better understand the linkages between forests, forestry practices, and freshwater stewardship, in a Canadian context.	NRCan will finalize a synthesis report on the role of forests and impact of forest management on Canada's water by assembling and reviewing scientific information and knowledge. This product will be developed in partnership with the University of Alberta. The publication will target members of the Canadian forest community.	By 2004, publish a synthesis report on the role of forests and impacts of forest management on Canada's water.	A better understanding of the linkages between water and forest ecosystems, and related federal government science activities. Better informed policy and operational decisions, leading to improved sustainable development practices over time.
The Canadian mining industry faces the ongoing challenge of complying with the regulatory requirements for effluents under the *Fisheries Act* in a cost-effective manner. Mine effluents are the largest environmental liability facing the Canadian industry. Low-impact chemical technologies and innovative biotechnologies have the potential to offer cost-effective and efficient tools for effluent treatment.	NRCan works with industry on the development of treatment strategies for mine, mill and metallurgical effluents. NRCan is developing chemical and biological treatment technologies for mine effluents by researching passive treatment systems; metal absorption using biosorbent from seaweed; and biotechnology for oxidization of thiosalts. Research partners include universities, consultants and the mining industry.	By 2004, test technologies that employ bacteria to naturally treat contaminants in mine effluents. By 2005, provide scientific report and conference presentation outlining biological and chemical processes occurring within passive treatment systems in order that they could be more widely utilized at mine sites in Canada. By 2006, develop scientific report and conference presentation on the use of alginate and paper mill sludge as metal adsorbents in mine effluent treatment.	Treatment systems that can be applied at mine sites and engineered to respond to the specific conditions at the site. Leadership in the design and development of sustainable treatment systems for mining operations.

Issue	Approach	Target	Anticipated outcome
Mining and related processing of ores produces wastes that are typically deposited in the natural environment. Understanding how metals behave in the environment is key to developing appropriate policies and strategies to manage them. Improved understanding of the potential toxicity of mine wastes in the receiving environment is essential for a valid characterization of mine effluents.	NRCan is conducting research to characterize mine effluents by evaluating the persistence of bioavailable forms of metals; characterizing hazards of metals and alloys; developing prediction models for chronic metal toxicity; and developing microcosm/macrocosm facilities. Research partners for this initiative include universities, consultants and the mining industry.	By 2004, complete study on geochemical behaviour of copper, zinc and cadmium in receiving waters. By 2005, complete study on hazard identification of stainless steel. By 2005, complete study of the effect of copper on the invertebrate indicator Ceriodaphnia. By 2006, conduct ecosystem column set-up.	Changes to the regulatory approach for environmental protection that are based on sound science. Development of prediction models that offer simple but accurate assessment of effluent toxicity and their acceptance by the regulatory community.
There are opportunities in Canada to develop more small- and medium-sized stations to generate hydroelectricity, as renewable energy source, often with little or no storage; but there are environmental concerns related to aquatic ecosystems. NRCan develops methods and technologies to mitigate impacts of hydroelectric development on aquatic ecosystems to help industry stakeholders meet regulatory requirements.	NRCan is involved in streamflow modelling and development of a management framework based on biological criteria, instream flow assessments, habitat requirements of fish species and studies on the effects of hydro-peaking on aquatic resources. NRCan will be also conducting a gap analysis on innovative impact-reduction technologies. One identified priority is the need for low-cost, reliable and efficient fish-friendly equipment for small and medium hydro sites.	By 2005, collect and report on innovative impact-reduction technologies and approaches at selected hydro facilities in Canada. Conduct a gap analysis to identify further R&D needs related to habitat management, fish bypass and water management operations. By 2006, develop three new modelling tools for stream flow assessments for use by utilities, federal and provincial regulatory agencies. By 2006, develop concept for specially designed fish-friendly turbines and advanced speed generators, conduct computational fluid dynamics analysis, develop model and conduct testing and field trials.	Streamflow management tools applicable to individual hydro sites to ensure compliance with the *Fisheries Act* and provide adequate protection of aquatic ecosystems. Canadian designed leading-edge fish-friendly hydro equipment for small- and medium-sized hydropower.
The small hydro industry requires data and tools to assess potential changes in streamflow regimes resulting from climate change. As most small hydro sites have little or no storage, they are especially vulnerable to climate change which may affect energy outputs and/or increase risks of extreme events such as flooding.	NRCan develops and adapts tools and methods for resource assessment and extremes analysis of small hydro sites. New research to address the impacts of climate change on small hydro is in the planning stages. Climate data will be obtained from Fisheries and Oceans (DFO) and Environment Canada (EC) and a partnership may be forged with EC.	By 2006, complete hydrological model calibration and validation for small hydro resource assessment across Canada. By 2007, complete extremes model calibration and validation across Canada. By 2008, complete comparison of present-day and future climate scenarios in small-scale watersheds representing various hydrological regimes in Canada.	Information on hydrologically vulnerable areas in Canada, specifically related to small watersheds where small hydro development is prominent. Climate change data and calibrated parameters that can be used in adapted resource assessment and extremes models for site-specific analysis of climate change impacts.

Satellites that fight forest fires: Fire M3

As myriad forces have compelled Canada's forest industries to find more environmentally friendly and economically viable ways of doing business, the sector has availed itself of recent advances in biotechnology, information science and chemical engineering, and has invested in the development of new machines and new ways of using knowledge.

Remote sensing—scanning the Earth's surface by satellites or high-flying aircraft to gather detailed information about the planet—is an important tool for the forestry sector. Using remote-sensing technologies to aid activities such as surveying and doing inventories is reducing costs and increasing productivity. Canadians have developed a cost-effective combination of computer software and airborne remote-sensing technology that produces far more detailed and meaningful pictures of forest composition, which helps forest planners and managers to incorporate environmental and other non-timber values into their decision making.

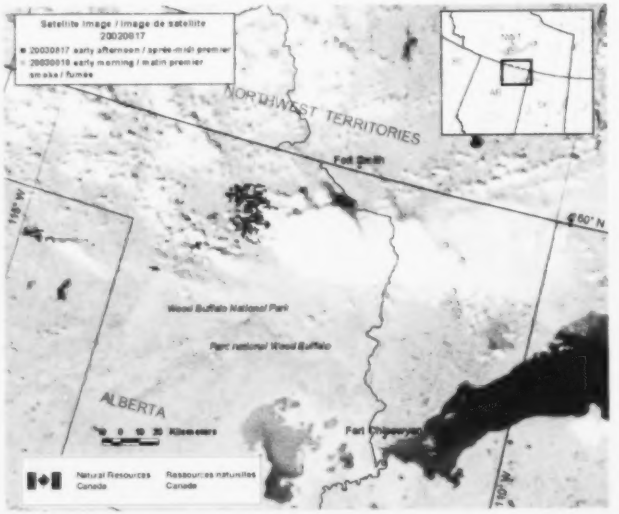
Remote sensing has also become a critical tool in forest fire management. Each year in Canada, forest fires claim roughly as many hectares as the annual harvest, making fire management a top priority for forest health and productivity. The 2003 fire season saw almost 8,000 fires burn more than 1.5 million hectares of forest. Averaged over the past 10 years, approximately 2.7 million hectares have been destroyed annually. Forest fires not only deplete timber resources, threaten nearby communities and create major disturbances within the affected ecosystem, they also contribute to the increase in atmospheric concentrations of gases (primarily carbon dioxide) that are linked to climate change. Monitoring forest fires is a critical aspect of sustainable forest management.

Fortunately, Canada's fire management system has revolutionized our ability to quickly detect and combat fires. The fire management system developed by Canadian scientists represents the culmination of 75 years of fire science. It includes computer programs that can help fire managers evaluate the risks and spread of forest fires, and can offer managers efficient

ways of fighting fires, right down to the number of water bombers needed and where to position initial-attack crews.

It is the new generation of fire detection and computer mapping, however, that has taken firefighting to the next level. The Fire M3 project features technology that uses satellites to track and map forest fires. A joint venture involving two Natural Resources Canada operations—the Canadian Forest Service (CFS) and the Canada Centre for Remote Sensing (CCRS)—Fire M3 was initiated to develop a fully automated national system to monitor, map and model ("M3") forest fires daily. It integrates the CFS's fire management systems with the CCRS's satellite monitoring and mapping technologies.

This project, now in its operational phase, is attracting international attention as the best fire-monitoring system in the world. The new technology is fully automated and provides more uniform, objective information than the older technology, which relies on traditional mapping techniques, such as aircraft surveillance, aerial sketch mapping and global positioning systems (GPS) mapping. Another bonus of the new system is the big financial savings. A third advantage of the new technology is that it gathers fire information daily and converts it into meaningful data, often within 12 hours. As a result, fire agencies can receive timely, detailed information.



The information gathered by Fire M3 is one of the data streams fed into NRCan-developed decision-support software—the spatial Fire Management System (sFMS)—designed to assist fire and land managers in their day-to-day management operations.

In 2003, the Fire M3 system was integrated into the Canadian Wildland Fire Information System (CWFIS), a Web-based fire information system that incorporates the information (maps, data, reports) provided by sFMS, Fire M3 and other operational systems within a single information source. People using the Internet can zero in daily on fire activity maps that contain the latest information, which is particularly important for communities in remote areas. By seeing the overall fire hazards in their area, local authorities and residents will have a better understanding of which fires pose real threats.

Canada's innovations and technology developments have been adopted by the forest sector worldwide. Our research results and innovative technologies have not only enabled Canada's forest sector to adjust to evolving public forest values and respond to emerging challenges, but they have also become a keystone of our competitive advantage in the international forest products market.

In the 1980s, the CFS Forest Fire Danger Rating System gained international recognition when it was adapted for use in New Zealand and Alaska. More recently, the Canadian Wildland Fire Information System (CWFIS), based on Fire M3 technology, has been adapted for use in B.C., Alberta, Saskatchewan, South East Asia, Florida and Mexico, with other provinces and countries giving it close consideration. CWFIS creates daily fire weather and fire behaviour maps year-round and hot spot maps throughout the forest fire season, generally between May and September.

Canadian Wildland Fire Information System
http://fire.nofc.cfs.nrcan.gc.ca

Action 1.4: Apply, support and share best practices and models

Issue	Approach	Target	Anticipated outcome
Government, industry and the public do not yet make full use of available information when making decisions on sustainable development related issues. This is at least in part due to the fact that the information is not available in sufficiently 'user friendly' form and because there are not yet sufficient geospatial modelling methods readily available to reliably fill gaps in baseline knowledge.	NRCan will develop tools to integrate information such as land cover, land-use change and drought monitoring for use in decision making on sustainable development issues. The system will enable clients to make use of information and knowledge in a broad multidisciplinary context. This program builds on information foundations such as the Atlas of Canada and the Canadian Geoscience Knowledge Network, and will include a wide range of data sources, including earth observation imagery, maps and ground data.	By 2006, develop advanced prototype decision-support systems and data models which will be operational in 2008.	Geospatial (geomatics and geoscience) information and models are used by federal and provincial governments in decision making, resulting in better decisions for truly sustainable development. Decisions about resource development and use are supported by a comprehensive knowledge base that integrates social, economic and environmental considerations. Increased sales of related products and services by Canadian industry.
Environmental and social issues remain outside the mainstream of the financial analysis and valuation that provide the foundations for investment decisions and corporate strategy. More communication and research will help to integrate the impact of sustainable development practices on share price and increase appreciation of SD as a value driver.	NRCan will demonstrate a methodology to the financial sector that includes environmental and social issues in the financial analysis of publicly traded companies. The initiative is intended to encourage financial analysts to demand sustainable development information from companies, resulting in further commitment to the integration of social, environmental and economic considerations by publicly traded companies. NRCan will be partnering with the finance sector, academics, businesses and other government departments.	By 2004, complete a financial analysis of companies within the natural resource sectors that accounts for the economic impacts of their social and environmental practices. By 2004, disseminate and share results with the financial sector and other interested parties.	Increased demand for sustainable development information in the finance sector. Financial analysts increasingly consider economic, social and environmental information when valuing companies and accept the business case for sustainable development. Increased adoption of sustainable development practices and reporting, resulting from information demand of the finance sector.
Significant information gaps exist on the most effective approaches being adopted by natural resource companies with respect to sustainable development, and reporting on sustainable development activities. In particular, small- and medium-sized enterprises lack information and tools to advance manageable sustainable development initiatives.	NRCan will identify the consensus economic, social and environmental indicators being reported by natural resource companies, the best practices being adopted, and the associated cost-benefits of those practices. The initiative will identify the sustainable development information being reported by corporations and the practices which have the most impact.	By 2004, identify for a number of natural resource industries the consensus sustainability indicators being reported, the best practices companies are adopting with respect to sustainable development, and the cost-benefits of those practices. By 2004, disseminate the results as a toolkit to small- and medium-sized enterprises to assist them with integrating sustainable development into their operations.	Small- and medium-sized enterprises use the information to identify effective and achievable approaches to sustainable development. Increase in the number of companies committed to sustainable development. Companies employ more effective sustainable development approaches and actions.

Issue	Approach	Target	Anticipated outcome
The complexity of the Kyoto ratification debate underscores the need for more sophisticated analytic capacity to assess climate change policy options among federal and provincial economic analysts and policy makers, and representatives of stakeholder associations.	NRCan will develop integrated modelling capacity to evaluate the emissions, energy and economic implications for Canada of proposed climate change, energy and related policies. The model will incorporate information on a range of current and emerging technologies. The integrated nature of the model will permit direct comparison of economic and emissions consequences across options. The objective is for the modelling structure to become the common platform for analysis among federal, provincial and stakeholder decision-makers. This initiative builds on work of the National Climate Change Process, and closely links to federal technology initiatives. This will give Canada the needed analytic capacity for the second commitment period of the Kyoto Protocol.	By 2004, construct an integrated decision model. By 2004, employ the model to develop a new emissions outlook based on multi-stakeholder consultation. By 2005, model fully ready to evaluate policy options.	An integrated consistent framework for the assessment of the economic implications of energy and climate change policy alternatives. More transparent analysis of alternatives incorporating considerations of emissions reduction and economic impact. Deeper information base for public decision-making. Important contribution to Canada's analytic capacity for the forthcoming second commitment period negotiations.
There is an increasing emphasis on global cycles, especially carbon, in the assessment of sustainable management practices. There are indications that international carbon trading, which could flourish as a result of the Kyoto Protocol, may present Canada, as a forested nation, with significant commercial opportunity.	NRCan will develop and implement a 'user friendly' carbon budget model at the scale of a forest management unit to enable forest managers to evaluate the implications of their management actions on carbon stocks and carbon stock changes, and to assess alternative management strategies. Given sufficient data, it will also allow forest managers to evaluate and report on past carbon stocks in their management areas.	By 2004, test beta-version of the model in the Lake Abitibi and Western Newfoundland model forests. By 2004, conduct training workshop on the beta model for the two pilot sites. By 2004, make final version of the model available for distribution.	Enhanced ability of forest managers to understand and manage the impacts of their actions on carbon stocks.

Action 1.5: Support policy, dialogue and governance to increase the contributions of Canada's resource sectors to sustainable development

Issue	Approach	Target	Anticipated outcome
The United States Department of Energy identifies petroleum gas hydrates as the only resource that can prevent a long-term natural gas supply gap. Natural Gas is essentially a continental commodity, with limited opportunity for transoceanic shipment of liquefied natural gas. As the North American natural gas market is moving toward a consumption rate of 30 trillion cubic feet or more per year, it is necessary to find new, large sources of reliable natural gas supply.	Achieve work towards an approved proactive level gas hydrate program. The International Mallik Research Well consortium undertook resource characterization and natural gas production experiments which have confirmed the fuel potential of Canadian gas hydrates. The global leading effort of its type, the Mallik experiments position Canada and Canadians to lead both technology and innovation related to the development of this potential resource. The engineering and economic conditions for the commercialization of this fuel potential will be assessed if an aggressive program is approved.	By 2005, develop a policy road map for the creation of a multi-agency strategy to stimulate private-sector development of gas hydrates, in collaboration with other government departments and stakeholders.	Active development of exploration programs by Canadian industry to locate and characterize petroleum gas hydrate and hydrate/free gas deposits. National and international involvement of Canadian companies in the production of hydrate gas caps (offshore or Arctic) for commercial developments. Public and corporate acknowledgement that Arctic gas hydrates are a major economic resource.
The Atlantic Energy Roundtable has provided a critical forum for governments, regulators, suppliers and operators to maintain a dialogue that focuses on maximizing this sector's contribution to the economic and social well-being of the region, while minimizing anthropogenic effects on the natural environment. This roundtable is breaking new ground, bringing multiple regulators of the sector together with the regulated community to streamline the multiple processes and requirements, with the aim of reducing the collective regulatory burden without sacrificing protection of the environment.	NRCan will work with partners to facilitate continuous improvements to the investment climate for the Atlantic offshore oil and gas sector and increase opportunities for Canadians while minimizing the effects to the natural environment. Planned improvements include innovative smart regulation for sustainable development of offshore oil and gas, and enhanced competitiveness without reduced protection.	By 2004, deliver a timetable and commitment for implementing concurrent regulatory approval processes, and deliver the Supplier Development Initiative workplan for local opportunity generation and continuous improvement. By 2004, report to ministers on progress and seek commitment on further recommendations to grow the offshore industry in a sustainable way.	Increased investment through improvements to the efficiency and effectiveness of the regulatory regime. Policy tools that maximize the benefits of economic growth for the well-being Canadians. Better decision-making as a result of a process that facilitates dialogue, and provides more comprehensive and inclusive information. Demonstration of a sector-wide approach to regulatory reform involving multiple regulators and requirements impacting the same segment of the natural resource sectors.

Issue	Approach	Target	Anticipated outcome
Thousands of orphaned and abandoned mine sites have been identified across Canada, many of which are hazardous and without long-term closure plans. Local communities, the mining industry, environmental and conservation organizations, Aboriginal representatives and governments are working collaboratively through the multi-stakeholder National Orphaned and Abandoned Mines Initiative (NOAMI). The purpose of the initiative is to study and devise strategies, policy instruments and information transfer mechanisms related to the remediation of problematic abandoned and orphaned mines in Canada.	NRCan has struck a multi-stakeholder advisory committee on orphaned/abandoned mines. The workplan of this committee has been approved by Canadian Mines Ministers and is to advise on: regulatory and institutional barriers to collaboration; guiding principles, best practices for community involvement; data management and priorization; and funding approaches and preferred options. Taking action on orphaned and abandoned mines addresses environmental quality, public health and safety and improves the image of the mining sector.	By 2004, develop policy framework for reclamation standards. By 2004, develop recommendations for intergovernmental cost-sharing arrangements for high-priority sites. By 2005, develop guidelines for facilitation and coordination of voluntary reclamation activities. By 2005, develop guidelines for site assessment and priorization.	Concrete, inter-jurisdictional measures (practices, research methods, technologies and administrative/regulatory policies) to address the legacy of orphaned and abandoned mine sites in Canada. Demonstration that the impact of past mining practices can be addressed in a manner that contributes to sustainable development.
Past practices relating to the transportation, refining, and use of radioactive materials have resulted in contamination problems that must be remediated. NRCan has accepted responsibility for remediating certain radioactively contaminated sites where the contamination has resulted from very early industrial practices and the current owner cannot reasonably be held responsible. These situations are complex and require innovative and community-sensitive approaches.	NRCan provides policy direction and program funding for historic waste cleanups to the Low-Level Radioactive Waste Management Office, Canada's agent for resolving historic waste issues. Policy direction is guided by the Government of Canada Policy Framework for Radioactive Waste, which establishes that radioactive waste management is to be carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner. Historic waste cleanups provide opportunities for social and economic benefits as a result of improved environmental conditions.	By 2005, complete an inventory of all historic low-level radioactive wastes in Canada. By 2007, complete the environmental assessment and licensing phase of the Port Hope Area Initiative, which will provide for the long-term management of 95% of all of Canada's historic wastes.	Advancement of safe, environmentally sound, cost effective and integrated management of Canada's historic low-level radioactive wastes. Benefits to Canadians—environmental, social and economic—from the cleanup of contaminated sites and appropriate management of the wastes. Increased public engagement in sustainable land-use decisions.

Issue	Approach	Target	Anticipated outcome
Environmental assessment is known internationally as a primary tool for achieving sustainable development. In Canada, the integration of environmental factors into planning and decision making for physical initiatives is legislated under the *Canadian Environmental Assessment Act*. A renewed Act was promulgated in the fall of 2003 that encourages the continuous improvement of the EA processes at the federal level and to encourage actions that promote sustainable development.	NRCan recognizes that ensuring compliance with the new requirements in the revised federal Environmental Assessment (EA) process is a task fundamental to the Department's mandate regarding the sustainable development of Canada's natural resources. NRCan promotes the continual improvement of the EA process, informs and educates client sectors and the Canadian public, and takes every opportunity to enhance understanding of the importance of EA to sustainable development. NRCan will continue to assist and support client sectors in meeting requirements and to perform EA evaluations.	By 2004, develop new environmental assessment training materials and tools to comply with the revised *Canadian Environmental Assessment Act* (2003). By 2004, complete the training program for all NRCan staff on the revised *Canadian Environmental Assessment Act* (2003). By 2004, implement NRCan's environmental assessment Web application. By 2005, develop a plan to foster a more comprehensive understanding of environmental assessment and how it can be used to support sustainable development objectives among industry, special interest groups and the Canadian public.	**Within NRCan, increased awareness and continuous improvement of EA as a tool that influences the way projects are planned and decisions that support and advance sustainable development.** **More broadly, increased awareness of EA that will assist natural resource industries to better integrate environmental considerations in their projects. Among the Canadian public, increased awareness that will lead to more opportunities for participation in the decision-making process.**
Strategic Environmental Assessment (SEA) is a systematic, proactive and iterative process for evaluating the negative and positive environmental consequences of federal government policies, plans or programs to ensure that they are fully included and addressed at the earliest stage of decision making, on par with economic and social considerations. An SEA is required when a policy, plan or program proposal is submitted to a minister or Cabinet for approval, and when a proposal may result in important environmental effects, either positive or negative. The creation and promotion of an open and informative consultative process between government bodies involved in the SEA process is essential to the maximization of the benefits to sustainable development resulting from the use of this tool.	The promotion of continual improvement in the process of SEA is also fundamental to NRCan's mandate. NRCan has been conducting SEAs since 1990 and is committed to enhance the use of this tool to facilitate the incorporation of environmental considerations in its policies, plans and programs. When joining forces with another federal department to develop policies, plans and programs, NRCan pursues the opportunity to collaborate on conducting the SEA.	By 2004, develop formal SEA training materials and mechanism for all appropriate NRCan staff. By 2005, expand the existing process to facilitate the undertaking of SEAs for all policy, plans, programs initiated by NRCan. By 2005, investigate and report on opportunities for NRCan to enhance public consultation when developing SEAs of policies, plans and programs. By 2004, submit a proposal for the development of a mechanism for interdepartmental consultation on SEA for multi-departmental initiatives. By 2005, report on the development of, and NRCan's participation in the multi-departmental SEA consultation mechanism.	**Increased integration of environmental considerations with social and economic ones in NRCan's policies, plans and programs.** **Increased interdepartmental support for fostering sustainable development in the natural resource sectors.**
Legislative and policy instruments designed to further sustainable development are regularly reviewed by the federal government to advance the sustainable development goals set by the federal government. NRCan actively takes part in these processes to influence the inclusion of sustainable development principles in the revised legislation and policies.	NRCan will participate in the *Canadian Environmental Assessment Act* (CEPA) review process to influence the inclusion of sustainable development principles within the Act. The Federal Toxic Substances Management Policy (TSMP) and other initiatives designed to control releases of toxic substances are essential to sustainable development. NRCan will improve its performance in relation to these policies.	By 2005, initiate an intradepartmental forum to deal with the upcoming review of the *Canadian Environmental Assessment Act*. By 2004, revise and update the strategy, Toxic Substances Management Policy Implementation at NRCan.	**Environmental protection legislation and policies incorporating the principles of sustainable development.** **Promotion of actions needed to achieve sustainable development.**

Action 1.6: Engage Aboriginal communities in sustainable land and resource development and use

Issue	Approach	Target	Anticipated outcome
To improve Aboriginal knowledge and make progress on issues in sustainable forest management, there needs to be a certain level of trust and respect among all those involved. In order to accomplish this, systematic tools related to integrating Aboriginal knowledge into forest management need to be developed for use by Aboriginal communities and the forest sector.	Through its outreach programs, NRCan will provide leadership in cross-cultural and collaborative learning opportunities regarding sustainable forest management in an Aboriginal context. In partnership with the Model Forest Network, NRCan will develop tools and methodologies for addressing and integrating Aboriginal issues and knowledge into sustainable forest management. This initiative will build on work of Canada's Model Forests Program and the First Nations Forestry Program.	By 2004, hold a workshop on Aboriginal related indicators of sustainable forest management. By 2004, complete a synthesis report on indicators of sustainable forest management developed by or for Aboriginal communities in Canada. By 2004, complete a report on standards of Aboriginal cultural research in Canada.	Increased involvement of Aboriginal people in sustainable forest management throughout Canada. Improved cross-cultural working relationships. Increased understanding of Aboriginal issues and priorities for sustainable forest management.
Global drivers such as sustainable development, economic reform and technology, influence the way societies interact with land over time. This changing humankind-to-land relationship results in changing land markets, hence changing land administration infrastructures, which result in new demands on spatial data infrastructures. Current land administration systems on Aboriginal lands are inadequate for addressing sustainable development objectives, which are intimately linked to good governance, the environment, and economic development. The implementation of cadastral systems, which is a form of land administration, is a key component to support and facilitate the way society interacts with land.	To support Aboriginal land and resource management, NRCan will provide northern communities with necessary property rights information. This complex issue will be addressed through the provision of an integrated suite of projects that deal specifically with the boundary or cadastral component of the property rights infrastructure on Aboriginal Lands. Partners include Indian and Northern Affairs Canada, Aboriginal communities and institutions such as the National Aboriginal Land Managers Association, Lands Advisory Board and Indian Oil and Gas Canada and the Association of Canada Lands Surveyors.	By 2005, develop and produce specialized geomatics products in support of effective Aboriginal land administration.	Increased efficiency, effectiveness and self-sufficiency of Aboriginal land and reserve management, investment in land management and economic development. Increased environmental benefits and enhanced economic and social capacity in Aboriginal communities. Sustainable community development and stimulation of local economies through capacity building.

Issue	Approach	Target	Anticipated outcome
Northern and remote communities are often very dependent on fossil fuels for all their major energy usages (transportation, electricity, and space and water heating) and, as a result, contribute to greenhouse gas emissions. For instance, approximately 130 communities rely on diesel generation for their electricity. Opportunities exist for emissions reduction through increased energy efficiency and the use of alternative energy sources, but expertise in these areas is limited in these communities.	NRCan will work to support efforts by Aboriginal and northern communities to improve their energy efficiency and use alternative energy sources. Key areas of action are: community energy planning and management; renewable energy and improved technology applications (e.g., small hydro, wind, solar, variable generators); enhanced energy efficiency of existing and new Aboriginal housing and facilities; and capacity building, training and tools.	By 2006, work with three regional Aboriginal housing committees to integrate energy efficiency into their decision-making processes. By 2006, work with five Aboriginal or northern organizations to implement a renewable energy project.	**Increased understanding and involvement of Aboriginal and northern communities in climate change mitigation activities.** **Increased capacity to plan for and implement energy efficiency, renewable and alternate energy technologies, and reduce the reliance on diesel generation.** **Reduction in greenhouse gas emissions generated by Aboriginal and northern communities.**
The use of natural resources in energy production can result in the production of emissions and wastes. Nuclear-generated electricity results in radioactive waste that must be managed for the long-term. The development of a long-term management solution for nuclear fuel waste involves a consultative process among Canadians. In 1998, NRCan indicated that it would initiate an Aboriginal designed and implemented participation process following a ten-year Environmental Assessment Process concerning the long-term management of nuclear waste. In 2002, the *Nuclear Fuel Waste Act* was passed further instilling the important role Aboriginal peoples would play in providing their views and opinions in advance of a decision on nuclear fuel waste management.	NRCan will facilitate an Aboriginal designed and implemented Aboriginal participation process that provides capacity to learn, develops internal resources and allows the Aboriginal groups to conduct a dialogue amongst themselves on this important policy issue. The design of the process and the emphasis placed on the Aboriginal groups themselves is a socially responsible proactive approach to a critical environmental issue. It provides early opportunity for the Aboriginal peoples to provide their opinions in advance of a decision. It allows for the development of a long-term professional relationship between the federal government and groups critical to sustainable development initiatives. This process builds upon the work of the environmental assessment panel, the 1998 Policy Statement, and five years of dialogue with Aboriginal groups.	By 2006, complete a consolidated consultation report containing both quantitative results and qualitative assessments of views and opinions of Canada's Aboriginal peoples concerning nuclear fuel waste management.	**Integration of the views and opinions of Canada's Aboriginal peoples in a critical social, political and environmental decision-making process through a culturally reflective consultation process.** **Create a long-term body of knowledge concerning Aboriginal views and opinions.** **Develop capacity for long-term integration of Aboriginal people in resource decision-making.**

Issue	Approach	Target	Anticipated outcome
In Canada, particularly in the North, minerals and metals activities take place in close proximity to Aboriginal communities. As these communities are influenced by minerals and metals activities, it is important that Aboriginal peoples are involved in decisions about mineral resources that affect them. Enhancing the economic and social capacity of Aboriginal communities would increase participation in minerals and metals activities and help to foster mutually beneficial relationships between Aboriginal communities and the mining industry.	The governments, industry and Aboriginal organizations have agreed to pursue the implementation of proposals to increase the capacity of Aboriginal communities and individuals to participate in minerals and metals activities. NRCan will work with partners to develop a national information toolkit, as well as a communications strategy and products targeted at far north Ontario. The information products will address economic, environmental and social impacts and benefits of mining, such as employment and business opportunities.	By 2004, develop national information toolkit targeted for tabling at Mines Ministers Conference. By 2004, produce a regional communications strategy and develop a video on the mining cycle for Aboriginal communities. By 2004, develop and upgrade the Web site mapping Aboriginal community information with up-to-date information on mine sites and the mineral industry information in Canada. By 2006, facilitate an international workshop on Aboriginal best practices in the sustainable development of mining.	Increased contribution of mining activities to sustainable development. Greater awareness and knowledge among Aboriginal communities of mining and its opportunities, and the potential environmental, economic and social impacts. More awareness and activities planning for mine closure and land reclamation. A more attractive investment climate for minerals and metals in Canada.

Action 1.7: Facilitate skills development and increase public outreach

Issue	Approach	Target	Anticipated outcome
A behavioral shift by policy- and decision-making organizations to include sustainable development practices in management of Canada's natural resources is needed to ensure opportunities and benefits for future generations. To achieve this shift, communities need a better understanding of what sustainable development means.	Communications, outreach and awareness activities for all interested stakeholders to promote usage of quality geospatial information to support sustainable development and management of Canada's natural resources. NRCan will develop a CD-ROM, Web site, educational workshops, technical papers and articles, and distribute these materials to a variety of audiences.	By 2006, develop a complete and integrated package of communication, outreach tools and activities to increase use of geospatial information to support sustainable development and management of natural resources.	Improved awareness, usage and access to basic geospatial information in support of sustainable resource development and management.

Issue	Approach	Target	Anticipated outcome
Responsible development of mineral and energy resources will be the basis for future economic development and will improve the quality of life of northern Canadians, most of whom are First Nations or Inuit.	NRCan will assist northern Canadians in attaining economic self-sufficiency, social stability and improved quality of life by increasing efforts to educate northern communities about the basics of geoscience and the opportunities that it presents. Construction of a comprehensive, regional mineral and energy geoscience knowledge framework that will catalyze responsible economic development through new private-sector investment in exploration. It will contribute to the development of the knowledge, skills and capacities needed by northerners to create employment opportunities in the northern communities. NRCan will co-deliver these initiatives with other government departments, the private sector, and universities.	By 2007, visit 10% of northern communities to provide introductory geoscience resource educational programs.	Greater awareness in northern communities of how to use geoscience information in developing employment in geoscience and the natural resource sectors. Increased number of northern students enrolled in geoscience education institutions.

SD Success Story

Building vibrant communities: The Sustainable Communities Initiative

The Sustainable Communities Initiative (SCI) has proven to be a resounding success for NRCan's efforts to help build community capacity in support of sustainable development. SCI was established to build and strengthen the capacity of Canada's communities to use government information and mapping services for their social and economic development. It is a component of GeoConnections, a national partnership initiative making geographical data available to Canadians through the Internet.

The focus of SCI has been to build capacity in small rural, remote, Aboriginal and northern communities that want to improve their control over their future—specifically, by providing them with modern mapping technologies to make informed decisions for sustainable development. SCI has provided this enabling capacity by helping communities learn, implement and use Geographic Information Systems (GIS) to make decisions about their economic, environmental and social development. SCI provides communities with geospatial information, often presented in computer-generated maps. Geospatial information can describe forests, lakes, rivers, fields, geology, highways, territorial boundaries—anything that can be defined geographically. By using this information to assess opportunities, evaluate options, and gauge trade-offs, communities can make better and faster land-use decisions.

The Sustainable Communities Initiative helped some of these communities beyond acquiring basic GIS functionality, by advancing professional development within the communities. SCI hosted workshops involving community members in the field of remote sensing and advanced GIS. For example the Introduction to Remote Sensing course was presented to representatives from five communities.

Experience gained through pilot projects was used to build the initiative into an operational program that was delivered to about 25 communities per year for the first four years. As a partnership initiative, SCI involved

the participation of NRCan and seven other federal departments and agencies, as well as provincial/territorial and community governments, the private sector, and voluntary organizations. The program objective of supporting up to 100 Canadian rural, remote, Aboriginal and northern communities has been met and exceeded. SCI will continue to share its experience with small communities interested in the use of geomatics for sustainable development.

Through its policies and programs, NRCan is committed to contributing to the achievement of priorities identified by communities for improved quality of life, and creating opportunities and removing barriers to sustainable development. NRCan plays a key role in the broader federal efforts to build sustainable communities, and continues, in partnership with communities, to design programs and initiatives that provide communities with the skills, knowledge and tools necessary for integrated decision-making.

Sustainable Communities Initiative
http://www.sustainablecommunities.gc.ca

Kivalliq: Geographical information for a better future

The future of Kivalliq, Nunavut rests on its ability to make the best decisions regarding its land and sea resources. With over 83,000 square kilometres of land to manage, and with several levels of authority that must have input into Nunavut's Land Use Plan, the Kivalliq Inuit Association (KIA) developed a geographic information system (GIS) to track and approve all land use applications.

During the 1980s, prior to the incorporation of Nunavut as a territory, several areas had been contaminated by commercial uses such as mining, and oil and gas exploration. The KIA, in turn, had no efficient system to track land use or to effectively rectify any contamination.

The KIA worked with the Sustainable Communities Initiative to set in motion a pilot project to develop its GIS. SCI provided funding for computer hardware, software, and training.

Using GIS, the KIA is now able to store all the information—traditional and scientific knowledge, information about wildlife populations, water resources, tourist activities, and oil, gas, and mineral deposits—that is required to make sound land-use decisions.

Key Result 2: Canadians are taking action to reduce greenhouse gas emissions and adapt to the effects of climate change

Canada recognizes that climate change presents an important challenge to sustainable development. There will be impacts that challenge our natural resource sectors and related industries, affect the economic foundations of communities, and threaten the well-being of Canadians. To address this global problem, Canada works with the international community and has ratified the Kyoto Protocol, committing to reduce our greenhouse gas emissions to six percent below 1990 levels by 2008–2012. There are no easy solutions to achieving this commitment—it will require action and ingenuity from all Canadians, communities and governments.

Over the past few years, extensive discussions have taken place between the federal government and the provinces and territories on how to achieve our Kyoto objectives. Stakeholders have been consulted on the best options for reducing greenhouse gas emissions. These discussions and consultations have helped to develop a federal emissions reduction strategy, embodied in the 2002 *Climate Change Plan for Canada*. The approach proposes the use of a series of different instruments to pursue emissions reduction in all sectors of Canadian society.

An important element of the approach is the negotiation of covenants on targets to reduce emissions of large final emitters in key industrial sectors. If left unaddressed, these emissions would be expected to form about half of Canada's total greenhouse gas emissions by 2010. NRCan is pursuing this approach with firms in upstream and downstream oil and gas production, electricity generation, and mining and manufacturing. Firms will be required to meet specific targets for the 2008–2012 period. In order to facilitate compliance in a cost-effective manner, NRCan will develop a domestic emissions trading system, with access to domestic offsets and international permits and credits.

Current forestry and agricultural practices are expected to act as carbon 'sinks' by removing carbon from the atmosphere. Enhancing these practices could provide additional emissions reduction 'credits' for the trading system. The Department will also be active in partnering on international opportunities in the natural resource sectors under the Kyoto Clean Development Mechanism and Joint Implementation. These mechanisms were established to help industrialized countries achieve their Kyoto targets. They provide opportunities for Canadian organizations and enterprises to participate in international projects to obtain emissions reduction credits.

A covenant approach would be difficult to implement in other sectors, such as the residential, commercial, institutional and transportation sectors. These sectors are characterized by large numbers of small emitters, making an approach driven by sector-based targets more difficult and costly to administer. Still, as a group, these sectors are responsible for significant emissions and cannot be overlooked. To achieve emissions reduction in these sectors, the Government of Canada is relying on a series of targeted measures, mostly in the form of information and incentive programs.

As the department responsible for energy policy, NRCan is at the centre of these program efforts. Existing departmental activities are being expanded significantly. Energy efficiency in buildings and transportation represents a key strategic focus. For instance, building on the success of EnerGuide, NRCan will expand the breadth of information available to Canadians, to help them examine the real costs and potential savings of their consumer choices. As well, a new incentive to encourage upgrading the energy efficiency of existing houses is being introduced. Another strategic focus is to achieve emissions reduction by encouraging no- and low-carbon energy sources. Several important initiatives are being implemented to encourage the production and use of renewable and alternative energy sources such as wind power and ethanol.

The Government of Canada recognizes the importance of technology and innovation as part of its emissions reduction strategy. Significant investments are being made towards the development of technologies that will help reduce emissions over the longer term and create new economic opportunities. With its technical expertise, NRCan plays a leadership role within the federal government in advancing the development and demonstration of new technologies.

Even with successful global emissions reductions efforts, climate will continue to change and Canada will experience climate change impacts. There are climate change implications throughout the natural resource sectors that will require adaptive responses by government, industry and communities. In the North, for example, it will be increasingly important to forecast, monitor and plan for changes in the permafrost that may affect highways, pipelines, buildings and other infrastructure. Information about possible shifts in forest ranges, risks of forest fires, pests and diseases and possible management responses can assist the forestry sector in preparing for these climate change impacts.

NRCan, through its funding programs and expertise, will be involved in expanding the assessment of vulnerabilities to climate change impacts to all areas of Canada. The Impacts and Adaptation Program will continue to play a leadership role, delivering a national assessment of the impacts of climate change and our capacity to adapt to them as well as developing outreach materials to increase awareness of the impacts of climate change and the need to address them in the future through adaptation. The Canadian Climate Impact and Adaptation Research Network will increasingly link researchers and stakeholders to ensure that research and activities contribute appropriate information for decision making.

Canadians are already beginning to adapt, planning ahead for the anticipated impacts of climate change; NRCan will be working to support Canadians, governments *and the private sector in addressing adaptation* challenges and opportunities. Adaptation responses are best handled in an integrated manner as policies developed by one department may affect another department's responsibility. NRCan leads the interdepartmental committee that provides strategic direction and coordinates federal activity on vulnerability, impacts and adaptation.

Action 2.1: Advance policy and dialogue to address climate change

Issue	Approach	Target	Anticipated outcome
In December 2002, the Government of Canada ratified the Kyoto Protocol, under which, Canada has agreed to a greenhouse gas emissions reduction target of 6 percent below 1990 levels during the period 2008 to 2012. To support the ratification decision, the Government of Canada released the *Climate Change Plan for Canada*, a framework for action. During the period 1997 to 2002, the Government of Canada initiated a series of actions to reduce greenhouse gas emissions, including through the *Action Plan 2000*. Budget 2003 committed $2 billion to climate change, of which $1.3 billion had been allocated to a series of concrete measures by the summer 2003.	NRCan will work with other departments to facilitate future decisions of the Government of Canada concerning climate change. As a result of Budget 2003, a series of new policies and programs are being developed and implemented by NRCan and other departments.	By 2005, evaluate effectiveness of policies and programs to reduce greenhouse gas emissions. By 2005, report internationally on Canada's progress in achieving its commitments under the Kyoto Protocol. By 2006, advise and support the Government of Canada in deciding the allocation of the remaining funding from Budget 2003.	**Effective advice that supports the Government of Canada's efforts on climate change in a way to minimize costs and maximize benefits for Canada.**
International negotiations on a post-2012 climate change regime are to begin in 2005. NRCan will help develop Canada's approach to this round of international negotiations.	Canada's approach will need to take into account Canada's national circumstances, and balance environmental and economic objectives. NRCan will work with other key federal departments to develop a Canadian approach and positioning in preparation for these negotiations. Consultations with key stakeholders and other levels of Canadian government will also be important.	By 2005, construct a Canadian negotiating position on climate change.	**Effective representation of Canada's interests in the climate change negotiations under the international United Nations Framework Convention on Climate Change (UNFCCC) that are to begin in 2005.** **Demonstration of Canada's global leadership on sustainable development.**
Provincial and territorial governments play a key role in the implementation of actions to address climate change. Funding of $160 million under the recently announced Opportunities Envelope is available to provide federal support towards cost-effective emissions reduction initiatives brought forward by provinces and territories.	NRCan will participate in bilateral and multilateral discussions with provinces and territories, to develop a collaborative approach to implementing mitigation measures.	By 2004, sign memoranda of understanding with interested provinces and territories. By 2005, have the Opportunities Envelope initiative operational and providing funding towards provincial and territorial action.	**Increased emissions reduction actions by provinces and territories.** **Improved multi-jurisdictional collaboration between federal, provincial and territorial governments in implementing mitigation measures.**

Issue	Approach	Target	Anticipated outcome
Canada is assessing the potential of fast-growing tree plantations for absorbing/storing significant quantities of greenhouse gases. A key component of this policy thrust is the development of options to channel major investments into additional plantations, thus increasing Canada's 'econological carbon storage infrastructure.'	NRCan will examine options to bring that investment to Canada, and how best to channel those monies. NRCan will build on international experience, such as the World Bank's BioCarbon Fund, and from countries such as Australia and members of the European Union. The development of options will examine existing legal frameworks and investment vehicle structures to facilitate the emergence of a vehicle to channel investments in fast-growing trees. NRCan will continue to work with the Working Group on Offsets and Large Final Emitters on the opportunity of carbon storage in trees.	By 2005, develop recommended options to attract investment for additional plantations.	A mechanism to encourage and manage investment in fast-growing plantations in Canada. Contribution to the Offset Trading System process.
The Kyoto Protocol provides mechanisms to help countries reach their targets. NRCan will facilitate access for Canada to international carbon credits through the Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanisms of the Kyoto Protocol.	NRCan will facilitate access for Canada to international carbon credits through CDM and JI projects that reduce emissions in other countries. Work with NRCan technology partners, and with DFAIT CDM-JI Office will strengthen linkages with potential Canadian technology partners within the natural resource industries in order to facilitate CDM-JI projects.	By 2005, establish, at minimum, one Clean Development Mechanism-Joint Implementation (CDM-JI) pilot project.	Increased awareness of CDM-JI benefits for the Canadian natural resource industries. Greater ease of implementation of CDM-JI projects by Canadian natural resource industries.
Climate change has started to affect the lives of Canadians and further changes in climate are expected. Governments at federal, provincial and municipal levels have realized actions must be taken to mitigate climate change impacts or to adapt to changes.	NRCan will improve the knowledge base related to Canada's vulnerability to climate change, in order to assist in decision-making on adaptation and better assess the risks. NRCan will address impact and adaptation issues at national, regional and municipal levels.	By 2005, complete scoping papers to method development for monitoring and assessments of the potential of biological and geological carbon storage. By 2005, contribute to the development of the national Climate Change Impacts and Adaptation Program report on Canada's vulnerability to climate change. By 2006, with municipal and/or provincial partners, produce and disseminate plain-language reports that describe impacts of climate change and best practices for municipal response to climate change.	Information to support municipal and provincial planning processes. Estimates of the cost of climate change to inform discussions about climate change commitments. Assessments and monitoring methodology that are used by Canadian agencies in their contribution to climate change negotiations. Synthesis products that are used by the national process and the Inter-governmental Panel on Climate Change.

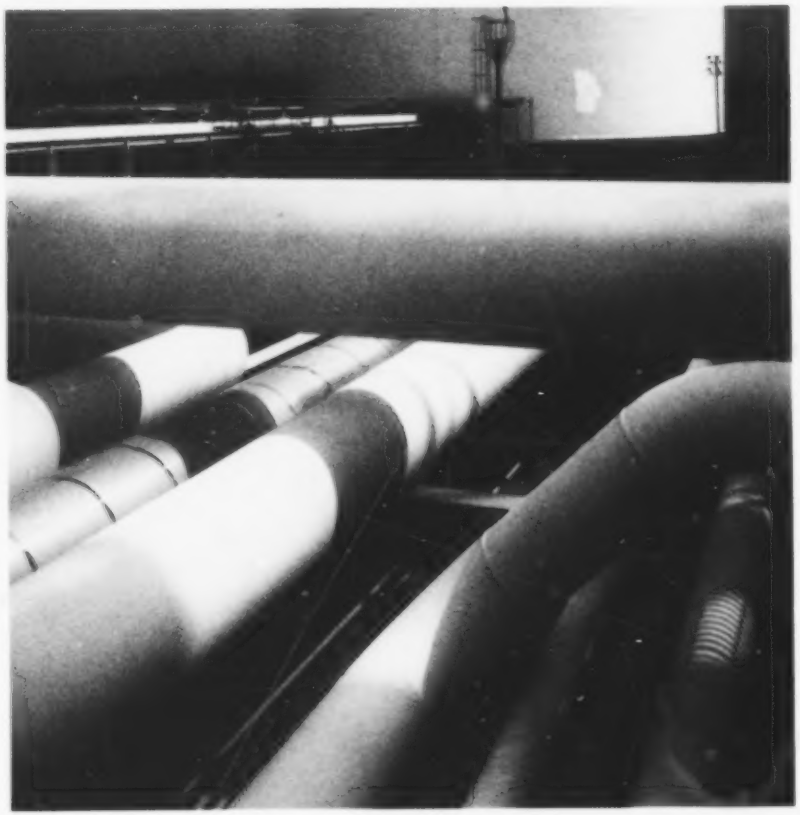
Action 2.2: Achieve emissions reductions through energy efficiency, renewable and alternative energy, and carbon sequestration

Issue	Approach	Target	Anticipated outcome
Canadians have a role to play in reducing greenhouse gas emissions. Social marketing initiatives will help to support a shift towards consumer behaviour that better supports sustainable development objectives.	NRCan will encourage Canadians to take action through outreach programs that increase awareness and understanding of climate change, and the link to energy use. Activities will include promotional initiatives, public information, Canada's Energy Efficiency Awards, and investment in joint initiatives in the youth and education sector. For example, the Energy and the Environment Calendar has been a very successful initiative that has involved schoolchildren from across Canada.	By 2007, establish and maintain awareness levels at 80%. By 2007, achieve a 30% increase in participation in outreach activities.	The Canadian public is more informed about climate change and energy efficiency. Individual Canadians are more willing to take action.
Seventeen percent of secondary energy consumption in Canada comes from heating, cooling, lighting and operating Canadian dwellings. There are opportunities to decrease energy consumption in new homes, existing homes, and equipment, thereby reducing greenhouse gas emissions.	NRCan will improve the energy efficiency of Canadian households through the use of: information; home energy audits; labelling and promotion, EnerGuide and EnergyStar premium labelling; equipment standards and regulations; R-2000 housing construction standard and training; and a grant program for home renovations to make homes more energy efficient.	By 2007, 20% average energy savings for homes that undertake a second, post-renovation EnerGuide for Houses audit. By 2010, all new housing at EnerGuide for Houses 80-R-2000 level.	Knowledge of opportunities for energy efficiency improvements in the residential sector and the ability to implement them. Reduced greenhouse gas emissions from residential sources. Longer-term, increased energy efficiency in the housing sector contributes to more sustainable use of natural resources.
The commercial and institutional sector accounts for approximately 13% of secondary energy consumption in Canada. This sector uses energy mainly for space and water heating, space cooling, lighting, and motive power for services such as pumping and ventilation in buildings. There are opportunities for energy efficiency improvements in new buildings, existing buildings, and equipment. The adoption of innovative and sustainable techniques for new building construction and for existing building retrofits can help drive reduced energy consumption and reduced greenhouse gas emissions. These initiatives also help achieve cost-effective business cases that support access to capital investment.	NRCan's approach is to improve the energy efficiency of Canadian buildings through program development and delivery. These programs use: information; training; voluntary initiatives; labelling and promotion; equipment standards and regulations; and financial incentives. The Energy Innovators Initiative provides a variety of tools and services, including technical and management information, training, advice and financial incentives.	By 2006, improve average energy intensity by 20% in retrofitted commercial and institutional buildings which have received financial incentives. By 2007, ensure that 10% of all new construction receive contributions from the Commercial Building Incentive Program.	Knowledge of opportunities for energy efficiency improvements in the building sector and the ability to implement them. Reduced greenhouse gas emissions from commercial and institutional buildings. Longer-term, increased energy efficiency in buildings contributes to more sustainable use of natural resources.

Issue	Approach	Target	Anticipated outcome
Renewable energy technologies for heating and cooling of space and water such as solar, biomass combustion and ground-source heat pumps, offer opportunities for Canada to displace use of fossil fuels and decrease greenhouse gas emissions from buildings. However, these technologies currently come with a high first-cost which limits demand. As well, decision makers such as architects, engineers and building owners are not yet fully familiar with renewable energy technologies.	The Renewable Energy Deployment Initiative (REDI) encourages the development of a self-sustaining renewable energy technology market and attendant infrastructure to serve Canadian industry, businesses and institutions including federal facilities. REDI works with partners to build awareness of renewable energy technologies and build the market for these technologies, so that price falls and demand increases—thereby displacing fossil fuel use and reducing greenhouse gas emissions.	By 2008, installation of 1000 new solar thermal and biomass combustion systems on Canadian business and institutional facilities. By 2008, installation of 25,000 new ground-source heat-pump systems on Canadian business and institutional facilities.	**Development of a self-sustaining renewable supply industry in Canada.** **Increased awareness, use of, and demand for renewable technology.** **Reduced greenhouse gas emissions.** **More competitive and profitable Canadian industries and businesses with lower energy costs.**
The transportation sector accounts for more than 28% of secondary energy use in Canada. Approximately 70% of greenhouse gas emissions from transportation are a result of people driving cars and goods being moved by truck. Carbon dioxide emissions from road transport increased more than from any other sector between 1990 and 2000. This occurred because the volume of heavy- and light-duty vehicle travel has steadily increased during the period. Further, there has been no significant improvement in their average fuel efficiency. With strong growth in travel expected to continue, this sector presents a challenge in contributing to emissions reduction towards Canada's Kyoto target.	NRCan aims to improve the energy efficiency of Canadians through the use of: education and awareness; information and tools; voluntary initiatives; training and best practices; vehicle labelling; new vehicle efficiency targets; technology demonstrations; and financial incentives.	By 2010, achieve an average fuel consumption reduction of 25% in the 2010 new vehicle fleet from current corporate average fuel consumption standards through the negotiation of an agreement with automobile manufacturers for a voluntary fuel consumption target (or set of targets). By 2010, expand fuel ethanol production and use in Canada, contributing significantly to Canada's target of having at least 35% of the gasoline supply contain 10% ethanol.	**Increased use of alternative fuels.** **Increased fuel efficiency of Canadian vehicles.** **Reduced greenhouse gas emissions from road transportation sources.**
Reducing industrial energy use per unit of production improves economic performance and contributes to Canada's climate change objectives. Currently, industry faces barriers such as a lack of knowledge of how to proceed with respect to identifying and implementing opportunities, lack of knowledge of more energy efficient technology processes and operating practices, lack of capital for undertaking upgrades, and a lack of confidence in the outcomes of a retrofit project.	The Canadian Industry Program for Energy Conservation (CIPEC), a sector-level industry/ government alliance, and the Industrial Energy Innovators Initiative, a company-level program, work together to address the barriers to planning, implementing, tracking and reporting energy efficiency projects in industry. NRCan provides support to these two initiatives via energy audits, sector benchmarking, technical information, energy-management workshops, employee awareness kits and events and best practices guides. NRCan also facilitates information exchange between and among sectors and companies.	By 2005, initiate 100 industrial energy audits. By 2005, recruit 45 new companies as Industrial Energy Innovators. By 2006, all CIPEC task forces to have targets and action plans.	**Knowledge of opportunities for energy efficiency improvements in Canadian industry and the ability to implement them.** **Reduced greenhouse gas emissions in the industrial sector.** **Longer-term, increased energy efficiency in industry contributes to increased competitiveness and more sustainable use of natural resources.**

Issue	Approach	Target	Anticipated outcome
While most Canadian electricity is already derived from renewable sources, including large hydro, increasing the capacity of these sources would allow us to reduce greenhouse gas emissions further from the electricity sector. Challenges associated with renewable energy sources such as wind, solar and biomass power include higher costs and inexperience with the use of these technologies. Government can facilitate the development of an appropriate policy, investment and regulatory framework, consistent with a competitive market for electricity, to encourage increased generation and capacity for hydro electricity and related transmission.	NRCan will work with interested jurisdictions to reduce barriers to interprovincial trade and transmission of electricity. The *Wind Power Production Incentive* and the *Market Incentive Program* complement this work by providing incentives towards the production and distribution of emerging renewable electricity sources.	By 2006, establish five new agreements under the Market Incentive Program to support distributors of electricity from emerging renewable sources in their marketing efforts. By 2007, install 1,000 MW of new wind energy capacity in Canada.	**New wind energy capacity.** **Reduction in greenhouse gas emissions.** **More renewable energy technologies as options in the supply generation mix.**
Governments can play an important role in the domestic strategy. Beyond developing and implementing a domestic emissions reduction strategy, the Government of Canada can take leadership action by reducing its own emissions.	NRCan will improve the energy efficiency of, and increase the use of alternative energy in Government of Canada operations through the use of voluntary commitments, information and training. Specifically, NRCan will work towards the reduction of greenhouse gas emissions from all federal operations to 31% below 1990 levels by 2010. This initiative provides a set of tools to assist departments in reducing their emissions resulting from energy production, distribution and consumption activities, employee behaviour, procurement activities and fleet management activities.	By 2006, complete agreements to purchase 450 GWh of electricity from renewable sources.	**Reduced greenhouse gas emissions from Government of Canada operations.** **Increased procurement of renewable energy.** **Demonstration of environmental leadership.**

Going underground: The Weyburn CO_2 Monitoring and Storage Project



The Kyoto Protocol presents Canada with a significant challenge to reduce its greenhouse gas emissions. Achieving the target of reducing emissions to six percent below their 1990 levels by the Kyoto commitment period of 2008–2012 will require action and ingenuity on the part of all sectors of Canadian society. The Government of Canada is implementing an emissions reduction strategy that encourages the use of currently available solutions, focussing on energy efficiency and alternative energy sources. The Government is also investing in the development of new long-term technologies to achieve further reductions. One federal priority in this area is the development of technologies for cleaner fossil fuel production, conversion and combustion. A very promising technology in this area is the capture and storage of carbon dioxide (CO_2) .

CO_2 capture and storage, in general terms, involves the capture, treatment, transportation and injection of CO_2 into a suitable geological formation. CO_2 is first captured from a suitable industrial source, such as a petrochemical processing facility or a coal-fired electricity generation plant. The gas stream is then treated and transported to the storage site where it is injected into the selected geological formation. In Western Canada, among the most promising commercial opportunities for storing CO_2 involve partially depleted oil reservoirs. Combining CO_2 injection with enhanced oil recovery (EOR) represents an opportunity to store undesirable greenhouse gas emissions while offsetting the cost of that storage by recovering some of the remaining oil.

The International Energy Agency (IEA) Weyburn CO_2 Monitoring and Storage Project is investigating the technical and economic feasibility of CO_2 storage in a partially depleted oil reservoir at Weyburn, located in southeastern Saskatchewan, near the U.S. border with North Dakota. This international research project intends to establish the degree of security with which CO_2 can be stored in geological formations during large-scale, commercial, enhanced oil recovery operations. This is being accomplished

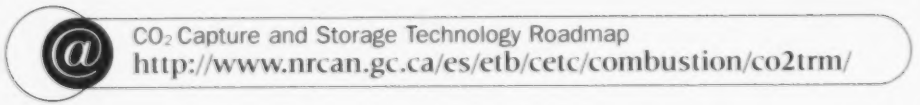
through scientific mapping of the movement of CO_2 in the reservoir, and technical prediction of future long-term CO_2 storage. The end result will be a credible assessment of the permanent containment of injected CO_2.

The IEA Weyburn project builds upon EnCana Corporation's $1.5 billion, 30-year commercial CO_2–EOR operation to recover an incremental 130 MMbl of oil at Weyburn. The project is unique because monitoring the geological storage medium (the oil reservoir) began prior to CO_2 injection. NRCan is one of 6 international government sponsors, 9 international corporations and 20 international research providers partnering on the four-year, $42 million first phase of the Weyburn project. The Regina-based Petroleum Technology Research Centre (PTRC), a research and development organization with the ability to collaborate with a number of research facilities, is acting as the coordinator for research on the Weyburn project. The PTRC is an NRCan-funded non-profit corporation with a mandate to develop new and improved technologies for application in the Saskatchewan oil and gas industry. Led by the PTRC, a team of the best international researchers has been assembled for each element of the project. The final reports for Phase I will be completed in mid-2004.

Phase II of the project will include continuing to monitor the movement of CO_2 in the reservoir and refining the risk/performance assessment to help determine the feasibility of CO_2 geological storage over the long term, measured in thousands of years.

The IEA Weyburn project intends to demonstrate, by 2010, that CO_2–EOR is economically viable, environmentally responsible and socially acceptable. Understanding CO_2 capture and geological storage is an important aspect of maintaining our fossil-fuel energy options while we take action on climate change. Geological storage also has the potential to limit the overall costs of Canada's greenhouse gas mitigation strategy, while providing significant economic benefits to technology providers and end-users. The information gained from the Weyburn project could be used worldwide for similar geological formations. A better understanding of the relationships between the related objectives of oil recovery and carbon dioxide storage could be used to help identify sites with low-cost CO_2 storage potential. The technology and understanding developed in this project will be of enormous significance to the establishment of geologic sequestration as a viable and publicly acceptable option for greenhouse gas emissions control worldwide.

Enhanced oil recovery (EOR) is one of several methods for geological storage of CO_2. Investigations are also under way to study the feasibility of utilizing unminable coal beds through enhanced coal bed methane production (ECBM). Non-commercial storage opportunities include deep saline aquifers, salt domes and rock caverns.



Action 2.3: Establish greenhouse gas emissions reduction targets for key industry sectors

Issue	Approach	Target	Anticipated outcome
Projections show that key industry sectors could produce about half of Canada's total greenhouse gas emissions by 2010. These industry sectors can make an important contribution to helping Canada meet its greenhouse gas emission reduction target. Innovative market mechanisms can increase the incentive for research, development, and deployment of new technologies.	NRCan will work with key industry sectors to reduce greenhouse gas emissions during the first Kyoto Protocol commitment period (2008–2012). To reach its objective, NRCan will develop a covenant approach, supported by backstop legislation, and a flexible framework for industry to achieve its goals, including: domestic emissions trading; access to Canadian offsets; and, access to international permits and credits. Ongoing consultations with provinces and territories, industry, and other stakeholders will ensure that the policies and measures are effective, administratively efficient and clear, help to maintain the competitiveness of Canadian industry, and respond to emerging environmental goals.	Through 2004–2006, NRCan will complete memoranda/letters of understanding with large final emitting companies that have stepped forward and meet covenant eligibility criteria. By 2006, work will proceed on the framework legislation and associated policy development, including development of a domestic emissions trading system that provides access to Canadian offsets and international permits and credits.	Clarity for key industry sectors on their contribution to Canada's goal of reducing greenhouse gas emissions during the period 2008–2012. Greater understanding of the various elements of the covenant approach among key industry sectors and players (for example, the emissions trading mechanisms that they may use to help them achieve their goals of reducing greenhouse gas emissions in Canada during the period 2008–2012).

Action 2.4: Undertake science and technology to reduce greenhouse gas emissions, and improve Canada's ability to further mitigate and adapt to climate change impacts

Issue	Approach	Target	Anticipated outcome
Long-term climate change technologies, such as cleaner fossil fuels, advanced end-use efficiency, decentralized energy production, biotechnology and hydrogen technologies, represent an opportunity for Canada to address its climate change commitments while supporting innovation and competitiveness in Canada.	NRCan will advance promising greenhouse gas reduction technologies through research and development, demonstration, and early adoption through the Technology and Innovation Initiative II. Involving federal and provincial governments, industry and academic partners, this initiative will support long-term knowledge and technology development to address greenhouse gas reductions through scientific models, experimental results, databases, and benchscale and demonstration scale prototypes.	By 2006, establish a science and technology foundation to support the development and demonstration of promising greenhouse gas reduction technologies.	New knowledge and technologies are available to Canadians to advance sustainable development in the development, conversion and use of energy. Improved environmental and social responsibility in the delivery of goods and services is enabled by S&T in the natural resource sectors.

Issue	Approach	Target	Anticipated outcome
There is increasing interest in using fast growing trees for fibre, carbon sequestration, farm-income diversification, soil stabilization and other social, economic and environmental reasons. Canada can address its commitment to reduce greenhouse gas emissions through the demonstration of fast-growing tree plantations.	NRCan will demonstrate that we have the technology to make fast-growing plantations a viable option for Canada by establishing a network of fast-growing tree plantation demonstrations across the country. NRCan will work with forest sector partners and delivery agencies to implement the plantation demos. A variety of fast-growing tree species will be planted. NRCan will evaluate existing experience and information regarding the use of fast-growing tree plantations and identify gaps in knowledge. Activities will then be focussed on addressing those gaps through targeted activities.	By 2005, establish fast growing plantation demonstrations in five regional areas. By 2004, complete evaluation and identification of gaps in knowledge and products. By 2006, produce materials and new knowledge to address gaps in information.	Showcasing of Canada's technical know-how in fast growing demonstration plantations. Test parameters for future investments in fast-growing plantations are established. Foundation for the establishment of additional fast growing plantations in Canada. Preparation for the inclusion of carbon sinks through afforestation in the international carbon market.
Energy supply studies indicate a potential continental natural gas supply gap, due primarily to demand growth from electrical power generation, an environmentally friendly fuel preference, and cost advantages.	NRCan will provide geoscience products and engineering activities that will start the process of transforming gas hydrates into a well characterized, successfully prospected, commercially viable and environmentally friendly natural gas supply.	By 2005, characterize Canadian gas hydrates occurrences, their resource potential and their development risks. By 2005, disseminate information to targeted industry and government audiences in various formats.	Development by Canadian industry of exploration programs to locate and characterize petroleum gas hydrate and hydrate-free gas deposits.
The commonly reported poor de-icing salt scaling resistance of concretes incorporating fly ash or slag creates barriers for the use of large amounts of supplementary cementing materials (SCMs) in roads and sidewalks. Replacing cement with supplementary materials decreases carbon dioxide emissions for every cubic metre of concrete produced. As well, less fly ash ends up as landfill waste. Improving the durability of SCMs in concrete will promote increased use.	NRCan, in partnership with a government-industry-university consortium, will research the de-icing salt scaling resistance of concrete incorporating supplementary cementing materials by conducting comparative field and laboratory investigation (technical activities); and networking (specifiers and standards organizations). The objectives are: to provide better understanding of the de-icing salt scaling resistance of concretes incorporating supplementary cementing materials; the development of specifications and standards to deal with the issue; to convince the different specifying agencies to increase the use of fly ash or slag in concretes exposed to de-icing salts; and to convince them that this will not jeopardize long-term field performance of concrete infrastructure.	By 2005, develop recommendations for new specifications and standards dealing with the use of supplementary cementing materials in concrete exposed to de-icing salts. By 2006, develop technical data on de-icing salt scaling resistance of concrete incorporating supplementary cementing materials.	Increased use of supplementary cementing materials in roads and sidewalks, which will help Canada reduce greenhouse gas emissions and meet international obligations under the Kyoto Protocol.

Issue	Approach	Target	Anticipated outcome
Alkali-silica and alkali-carbonate reactions (or AAR) is one of the major leading causes of concrete distress in Canada and worldwide. Use of SCMs (see previous item) is probably the best economical and technical way to control the risk of premature deterioration of concrete infrastructure incorporating reactive aggregates. Use of SCMs will lead to decreased reactivity and therefore increased life expectancy of concrete structures.	NRCan will also work with stakeholders involved with the supply and use of SCMs and the owners of structures that could be built using SCMs, to develop guidelines, specifications and standards. These stakeholders include federal, provincial and municipal governments (as owners and regulators), private-sector property developers, cement producers, concrete producers, architects and engineers.	By December of each year (2004, 2005, 2006) develop technical data on effectiveness of high-calcium fly ash on AAR. By 2007, develop recommendations for new specifications and standards dealing with the use of such ashes in concrete incorporating reactive aggregates (e.g. CSA A23.1/2; ASTM standard to be developed).	New specifications on the use of SCMs in concrete incorporating high calcium fly ash and reactive aggregates. Increased durability of concrete incorporating reactive aggregate.
Canada's overall objective in transportation research and development is to reduce energy demand and emissions in all modes of transportation —including road, rail and marine—while maintaining a reliable fuel supply. To do this, new lightweight transportation technologies are required.	The Canadian Lightweight Materials Research Initiative (CLiMRI) is an industry led, strategic initiative which focuses on materials development and application in all types of ground transportation vehicles. It involves the development of material compositions for high-strength steels, magnesium, aluminum, metal-matrix composites, plastics and ceramics where applicable. These technologies span the life cycle of lightweight materials production from the treatment of primary metal to recycling at the end of product life. The manufacturing technologies addressed include smelting and purification, advanced casting and metal forming technologies, joining technologies, coatings and corrosion resistance treatments, other fabrication technologies such as semi-solid forming and specialized heat treatments, and recycling technologies.	By 2004, make recommendations to the US Auto Materials Partnership regarding suitability of various coatings for the prevention of corrosion of magnesium alloys. By 2005, explore the feasibility of casting titanium for automotive parts. By 2006, produce prototypes of automotive components made in aluminum and magnesium alloys. In conjunction with the AUTO 21 Centers of Excellence, research the production of alloys 319 and 390. By 2006, work out the processing parameters for multiphase, ultra-fine grain steels. By 2007, develop in-house process capability for the warm forming of magnesium and aluminum alloys, as well as hydroforming of aluminum and steel tubes.	Reduced greenhouse gas emissions through improved vehicle efficiency. Improved competitive performance of the Canadian primary metals, automotive, truck, bus and railcar manufacturing industries and their associated parts suppliers. Greater knowledge among Canadian automotive industry suppliers on the options available for use and implementation of lightweight materials, especially in the design and manufacture of lower-weight components. Increased level of involvement and/or collaboration with the Canadian industry in optimizing vehicle weight and performance.
Management decisions regarding adaptation to climate change are made in the context of other resource-management considerations, and costs are an important aspect. Reliable scientific information on the future impacts of climate variability and change and the effectiveness of various adaptation options is needed.	The issue will be addressed through research based on satellite measurements and ground observations in regions of Canada sensitive to climate change; publication of scientific and plain-language reports; and incorporation of new knowledge in planning and resource management to minimize negative impacts of climate change by adaptation and mitigation.	By 2005, publish digital libraries of landscape sensitivity appropriate to the requirements of other government departments for priority regions. By 2005, complete quantitative assessment of terrestrial and coastal response to climate change in key physiographic zones (permafrost, coastal and near-shore environment, forests). By 2006, prepare national assessment of landscape and forest ecosystem response to climate change (two synthesis reports).	Regional databases, maps and reports that are used by federal and provincial/territorial governments to develop adaptation options. Improved information for the planning process of municipalities/provinces. S&T expertise contributes to the estimates of the cost of climate change.

Issue	Approach	Target	Anticipated outcome
Earth processes pose a variety of hazards to human safety and infrastructure in the context of climate change. Canadians, municipalities, provinces and territories need more information about the possible increase in natural hazards resulting from climate change. Critical infrastructure necessary for the transportation and development of natural resources are threatened by new natural hazard situations resulting from climate change.	NRCan will increase its capacity to identify, forecast, monitor, and report on natural hazards (including earthquakes, volcanoes, tsunamis, landslides and magnetic storms) and their events, and increase the capacity of Canadians and responsible authorities to mitigate and respond to their harmful effects. NRCan will also work to understand changes in the vulnerability of critical infrastructure to natural hazards because of climate change.	By 2007, NRCan will provide decision makers with national hazard inventories and assessments, improved hazard forecasting, an upgraded earthquake and geomagnetic monitoring system, and improved reporting capacity (including custom emergency maps and images) in response to complex crisis events and emergencies.	Reduced socio-economic losses due to natural hazards. Increased reassurance for Canadians that we will be able to manage the risk of hazards related to climate change. Decreased losses from earthquakes and landslides in population centers and critical infrastructure. Enhanced disaster response preparedness.
Seventy-five percent of all solid waste is disposed at an annual cost of $3.4 billion, rising 8% per year. A large portion of this waste can be recovered and reused. Resource recovery is energy efficient; energy efficiency in turn reduces greenhouse gas emissions.	NRCan will establish a multi-stakeholder recycling advisory committee to guide project development and enhance networking with the provinces, municipalities, non-government organizations and industry representatives. NRCan will implement projects that are relevant to the overall goal of reducing Canadian greenhouse gas emissions in an economically sustainable manner, to increase the recovery and recycling of multiple product streams across all sectors of the economy. This initiative is partnership based and has currently co-funded about twenty different projects involving pilots and demonstrations, consultations, network building, material-flow analyses, information transfer, barrier analysis, and life-cycle approaches.	By 2006, co-fund a minimum of 30 projects in partnership with other government departments, provinces, municipalities, industry and non-governmental organizations.	Improved resource recovery knowledge and expertise. Decrease, over time, in the amount of resources disposed in Canadian landfills. Reduced greenhouse gas emissions. New employment opportunities related to resource recovery. Increased Canadian competitiveness in global economy resulting from improved efficiency.

Key Result 3: Canada is globally recognized as a responsible steward of our natural resources and is a world leader in advancing sustainable development internationally

It is evident that Canada cannot achieve its sustainable development goals in isolation. If Canadians want to enjoy the benefits of a robust economy, clean environment, healthy communities, and peace and security, then it is in our interest to work towards ensuring that the rest of the world is also more prosperous, secure, equitable, and enjoys a clean environment. Helping to establish knowledge and capacity to support international sustainable development is also an opportunity to demonstrate Canada's stewardship and innovation excellence, potentially improving Canada's competitiveness in international markets.

NRCan's commitment to the sustainable development of Canada's natural resources includes optimizing social and economic benefits for Canadians. Therefore, NRCan is dedicated to maintaining or improving international market access for the products of Canada's natural resource sectors. The Department works with industry to address international trade barriers by improving and demonstrating sustainable development in Canada. This work goes hand in hand with contributing to establishing a more equitable global community.

NRCan plays a role in the development of international standards, policies and agreements through its participation in sector-specific international organizations and fora. For example, the Canadian Forest Service participates in the Montréal Process working to develop and implement internationally agreed criteria and indicators for the conservation and sustainable management of temperate and boreal forests. NRCan often works in cooperation with other federal departments to supply the Canadian contribution to international work concerned with sustainable development, such as the activities of Arctic Council's Sustainable Development Working Group. The Department also takes part in bilateral and multilateral initiatives and activities aimed at supporting sustainable development of natural resources around the globe.

Through sharing knowledge and best practices, and engaging in applied projects NRCan assists developing nations in gaining the capacity to plan for and implement sustainable development, particularly in their natural resource sectors. For example, the Minerals and Metals Sector is active in transferring knowledge and technology for non-polluting mining operations and mine-site rehabilitation practices in the developing world. In addition, NRCan's expertise in geoscience and geomatics is employed in support of priorities such as groundwater management, disaster management and mapping, hydrocarbon and mineral exploration, and assessing the potential impacts of climate change in developing countries and regions. The Department is participating in an increasing number of Canadian International Development Agency (CIDA)-sponsored projects to assist developing nations in establishing sustainable infrastructure planning and resource development.

Canada advocates the effective engagement of developing countries in international trade and environmental agreements, and building social and environmental considerations into trade discussions and agreements. NRCan contributes to this policy direction through its work on international policy development governing trade of natural resources products. For example, the Kimberley Process, a recent focus for the Minerals and Metals Sector, is helping to ensure that global trade in diamonds does not support devastating conflicts in several African nations, while also ensuring markets for the sale of Canadian diamonds.

NRCan's expertise supports Canada's foreign policy objectives and makes a significant contribution to sustainable development internationally. The Department's leadership in energy research and development, earth sciences, forestry, and minerals and metals has helped to create an international demand for Canadian knowledge and experience. NRCan can act as a catalyst in promoting Canada's knowledge and experience, creating opportunities for Canadian industry to participate in projects around the globe advancing sustainable development. New international collaborations may in turn spur Canadian innovation in the natural resources sectors and earth sciences.

Action 3.1: Address issues related to resource access within Canada, and international market access issues concerning Canadian natural resource products and producers

Issue	Approach	Target	Anticipated outcome
There are a number of information gaps that the wood industry must address to expand Canada's offshore markets. These include the need for a better understanding of the housing segment in offshore markets and the potential for wood frame construction housing systems; the need for a better understanding of domestically produced products versus competitiveness of offshore suppliers; the need to improve analytical capacity to assess opportunities in offshore markets; and the creation of export market development strategies for each principal market, based on an in-depth knowledge of each market. Creating export demand for Canadian wood products will improve the standard of living for forest-related communities, including the many rural communities across Canada dependent on the wood industry for their livelihood.	Acting as a catalyst, the Canada Wood program aims to spur industry to expand their marketing activities in offshore markets, to brand Canada as a preferred and dependable supplier of environmentally friendly, quality wood products. Canada Wood will build on and strengthen the wood sector's core competencies in market development, branding and technical capabilities. Canada Wood will create offshore market opportunities for Canadian wood product manufacturers, in response to an increased global wood supply, a series of trade disputes in the U.S. and intense competition from wood product suppliers in emerging producing regions. There are three elements to the program—overseas office representation, branding and promotional activities, and technical assistance (codes and standards, wood frame construction training, etc.).	By 2005, provide training in wood frame housing systems in China. By 2007, provide training in wood frame housing systems in Taiwan and Korea. By 2007, establish three additional offshore offices or representatives to provide a base for Canadian products to be showcased and marketed.	Greater knowledge and acceptance of Canadian wood products and our wood frame construction system to increase demand for our wood products. Increased opportunities for export growth, thus ensuring sustainable prosperity in the wood products sector. Sustained employment in Canada's rural communities.
Energy security and reliability, including the availability of energy from clean sources, are international challenges. There is a growing global marketplace for technologies that address energy needs while mitigating the environmental impacts of energy production, conversion, distribution and use. For its voice to be heard and influence felt on the world stage, as well as to promote its energy technologies globally, Canada must participate in international energy S&T activities and use them to leverage market opportunities for Canadian energy technologies.	NRCan will undertake bilateral and multilateral cooperation in the areas of science and technology with international organizations such as the International Energy Agency, Carbon Sequestration Leadership Forum, International Partnership for a Hydrogen Economy, and the North American Energy Working Group. NRCan will assist Canadian companies undertaking feasibility studies for international technology-transfer projects. NRCan will also undertake trade promotion and facilitation activities in collaboration with Industry Canada, Department of Foreign Affairs and International Trade and Environment Canada.	By 2006, increase international market opportunities for Canadian technologies.	Increased international market opportunities for Canadian technologies. Increased international uptake of Canadian technologies, energy products and knowledge. New technology alternatives to conventional resource use.

Issue	Approach	Target	Anticipated outcome
Improving the effectiveness and efficiency of Canada's recycling industry will promote the wise use of Canada's valuable resources, divert waste from landfill, provide well-paying jobs to regional/rural communities, and strengthen Canadian companies competitiveness internationally. Canada's recycling industry is constrained by Canadian regulations that impede their access to recyclable materials.	NRCan will implement Canada's Mineral and Metals Policy to regulate recyclable materials based upon the risk they present to human health and the environment. NRCan will work with Canada's recycling industry, all provinces and territories, Environment Canada and DFAIT. This action is consistent with advancing Canada's international policy on regulatory reform.	By 2004, amend Canada's Export and Import of Hazardous Waste Regulations to facilitate international access to recyclable materials.	Improved access to essential recyclable resources, while the environment is protected. Improved ability to recycle domestically generated materials making Canada more self-sufficient. Canada is showcased as an international leader in the wise and efficient use of natural resource materials. Maintained employment and critical industry contributing to the economy and quality of life in rural and remote regions.
Canadian mining companies are responsible for almost $50 billion worth of accumulated investment outside of Canada, in addition to their investments across Canada. The Canadian government wishes to maximize the benefits to Canadians of this global world-class sector and its allied industries. There is a need to reach out to major foreign and domestic mining companies who have an interest and ability to invest in new projects in Canada: foreign governments and Canadian companies with operations abroad; Canadian and international mining companies with global operations and companies from Canada's industries allied to mining.	NRCan will communicate the positive aspects of the Canadian investment climate to corporate decision-makers in Canada and abroad, for the purpose of maximizing investment in Canada. NRCan will also respond to requests from foreign governments or Canadian companies abroad to become involved in explaining measures to establish a 'level playing field' for mineral investment, for the benefit of the host country and also for Canadian companies operating worldwide. This will be done by ensuring that Canadian mineral-related investments abroad are given national treatment (protection of Canadian interests); promoting the use of Canadian mining equipment and services; and encouraging greater cooperation between Canadian mining companies with operations abroad and international Canadian mining equipment and service providers.	By 2004, meet with delegations from foreign governments interested in studying and assessing Canada's administration of its mineral resources, and how to establish a competitive investment climate in Canada as a stable source of supply of minerals and metals and/or as a centre of expertise in all phases of minerals and metals activity. By 2004, meet with a number of foreign governments to communicate the positive aspects of the Canadian investment climate. By 2007, work towards the completion of a major investment in Canada by Korea and/or China.	Better awareness of Canadian investment opportunities on the part of both foreign and domestic investors, and foreign governments, leading to increased investment in Canada. Resolution of investment protection issues negatively impacting Canadian investments abroad (regarding outward investment from Canada). Greater use of Canadian mining-related equipment and services by the global mining community.
Base and precious-metal reserves are at historic lows and threaten the sustainability of metal mining in Canada and the downstream industries that rely on a secure domestic supply of these metals. There is a need to evaluate exploration incentives to replace declining metal reserves.	NRCan will work with the Intergovernmental Mineral Taxation Working Group, industry, associations, Finance Canada and the Canada Customs and Revenue Agency to evaluate the merits of an extension for the federal 15% tax credit for exploration, and to evaluate the industry's request to have community consultation (particularly with Aboriginal groups and baseline environmental studies) included in Canadian Exploration Expenses, which are eligible for fast write-offs.	By 2004, provide Canada's Mines Ministers with analysis and recommendations of the intergovernmental mineral tax working group on exploration incentives.	Investment attracted for exploration and mine development in Canada sufficient to replace depleting metal reserves. The northern communities that depend on mining are sustained, and an appropriate level of community and Aboriginal consultation and baseline environmental studies are undertaken before new projects are initiated.

Issue	Approach	Target	Anticipated outcome
The continuing ability of Canada's base metals smelters and refineries to contribute to sustainable development depends on various cost factors associated with the geographic origin of smelter feed supplemented by recycling. These, in turn, are affected by the level of mineral development in Canada and the regulatory regime which defines waste. The economic consequences of these factors need to be more fully understood.	Address these informational needs by providing an assessment of the economic challenges facing Canada's base metals smelting industry with a view to suggesting strategies which will maximize their contribution to sustainable development and the well-being of Canadians. On the environmental front, the future viability of Canada's base metals smelters is closely tied to the Canadian mineral production, access to recyclables, and implementation of competitive environmental improvements.	By 2004, produce recommendations for federal action on how to address challenges faced by Canada's base metals smelters and refineries.	Identification of priorities for action in areas affecting Canada's smelters which will strengthen sustainable development in the base metals sector.

Curbing trade in conflict diamonds: The Kimberley Process

During the twentieth century, diamonds became known the world over as a symbol of love and eternal devotion. But in the 1990s a darker side of the international trade in diamonds gained the world's attention. Funnelled through secretive networks, some of these precious gems were carrying a huge cost in human suffering.

In the underground world of black markets and money laundering, diamonds are more than commodities: they are a form of currency—in some cases the preferred way to move value around. Diamonds have been used to back international loans, pay debts, pay bribes, and buy arms, and there have been accusations of their use in funding international terrorism.

But the issue that captured the world's attention was the link between the illicit international trade in rough diamonds and armed conflict, particularly in some African countries. While these 'conflict diamonds' only ever constituted a very small percentage of the international trade in rough diamonds, they have had a devastating impact on peace, security and sustainable development in affected countries. Conflict diamonds are rough diamonds used by rebel movements or their allies to finance conflict aimed at undermining legitimate governments.

Consumer awareness of the connection between trade in conflict diamonds and gross human rights violations in affected areas was leading to actions which could have endangered the entire diamond trade, including the emerging diamond industry in Canada. The world needed to find a solution which could balance the need to stop conflict diamonds, while promoting diamonds that contribute to economic development.

Canada has played a leadership role in international efforts to end the trade in conflict diamonds. Within the United Nations (UN), Canada has been at the forefront of several initiatives to address this problem, including sanctions prohibiting the import of uncertified rough diamonds from certain countries. The UN General Assembly has adopted resolutions,

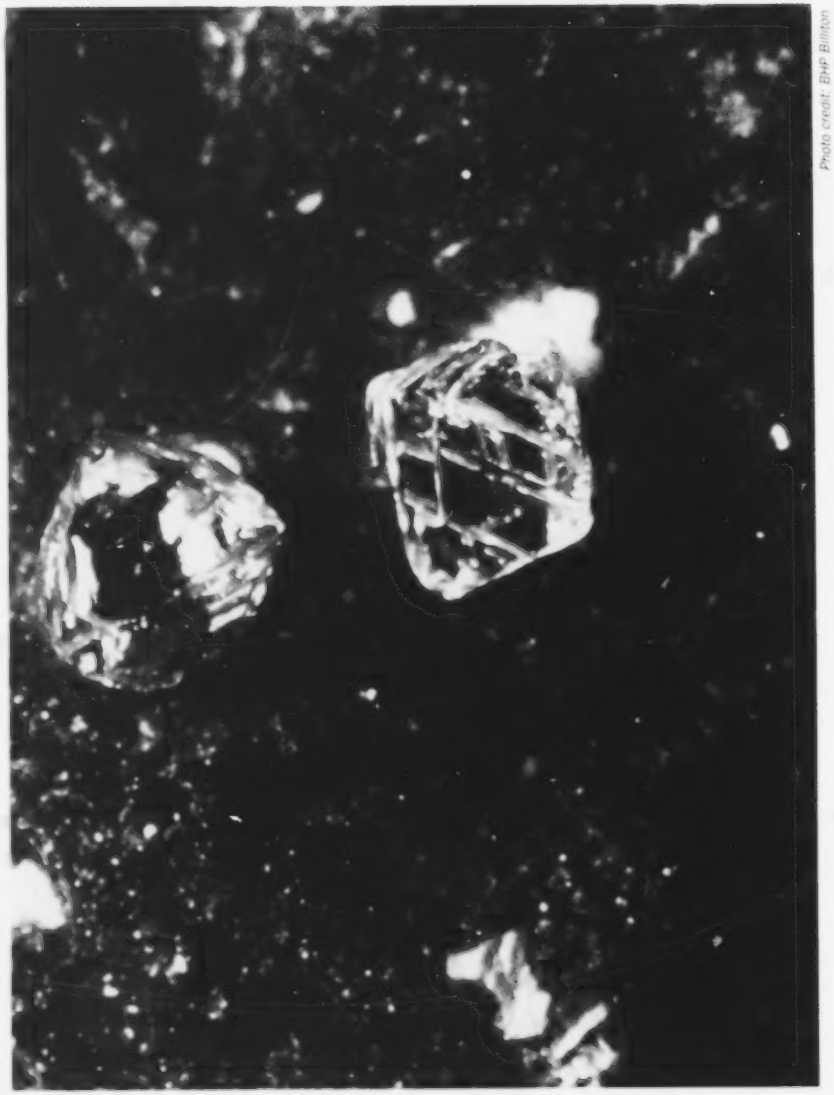


Photo credit: BHP Billiton

co-sponsored by Canada, calling for the development of an international certification scheme for rough diamonds to tighten controls over the diamond trade and prevent conflict diamonds from entering legitimate markets.

The Kimberley Process brings together governments, the diamond industry and non-governmental organizations with the goal of curbing the trade in conflict diamonds through the development of such a scheme. The name comes from the city of Kimberley, South Africa, where the Process was launched in May 2000. It started out as a consultative process, later becoming a negotiating process which culminated in the adoption of the Kimberley Process Certification Scheme (KPCS) in November 2002. It sets an international benchmark for national certification schemes to be implemented by each participant country through national legislation.

The simultaneous implementation of the KPCS—in Canada and some 43 other countries accounting for 98 percent of the global trade in and production of rough diamonds—began on January 1, 2003. In Canada, the *Export and Import of Rough Diamonds Act* (EIRDA) commits the Minister of Natural Resources to fulfill Canada's obligations as a participant in the Kimberley Process, which has permitted Canadian diamond producers to continue exporting without interruption. Natural Resources Canada has put in place a mechanism to issue Canadian Kimberley Process Certificates. All shipments of rough diamonds imported to or exported from Canada are required to have a certificate. Trade in rough diamonds with countries that do not participate in the scheme is prohibited.

By effectively controlling the trade in rough diamonds through national certification schemes, the trade in diamonds will be more transparent and secure—consumers can have a reasonable degree of confidence that the diamonds they buy are clean. Monitoring and regular review will ensure that the effectiveness of the KPCS is maintained. This consistent and stable framework for trade in diamonds has significant benefits for all countries that have an interest in the diamond industry worldwide, especially for developing countries. But the main beneficiaries of the effective implementation of the Kimberley Process are the people of countries affected by rebel activity—rebels who will no longer be able to fund human rights abuses by trading in conflict diamonds.

Conflict diamonds do not represent the only occurrence of a link between the exploitation of natural resources and human rights abuses. Canada will continue to be a proponent of harnessing the social benefits of resource development around the world to secure greater equity.

Facts about the Canadian diamond industry:

- **Diamonds were discovered in the Northwest Territories in 1991.**
- **Canada's first diamond mine began operations in 1998.**
- **Forecasts indicate that by 2003 Canada will rank third globally in terms of the value of annual diamond production—after Botswana and Russia.**
- **By 2007, there could be four mines open in the N.W.T. and western Nunavut. Annual production from diamond mines could soon reach $1.6 billion, and they are expected to generate about 1600 direct jobs.**
- **Advanced diamond exploration is pointing to the prospect of additional mines in the N.W.T., Nunavut, and Ontario and exploration is also under way in Alberta, Saskatchewan, Manitoba, Quebec, and Newfoundland and Labrador.**
- **A small diamond cutting and polishing industry is centred in Yellowknife and in the Gaspé region of Quebec.**

http://mmsd1.mms.nrcan.gc.ca/kimberleyprocess/

Action 3.2: Forge partnerships for advancing the contributions of natural resource sectors to sustainable development internationally

Issue	Approach	Target	Anticipated outcome
Currently, national governments with an interest in advancing sustainable mineral development lack a functioning global venue to discuss issues of mutual concern, hindering their influence in global intergovernmental policy discussions.	National governments with responsibility for mining, minerals and metals will share experiences and information, provide mutually supportive advice and make recommendations on minerals and metals issues to intergovernmental fora on ways to enhance the contribution of mining to sustainable development. Critical issues that merit international discussion include: governance and capacity building; social/ communities concerns; socio-economic matters; and environment and product stewardship. Canada and South Africa initiated the Global Dialogue as a Type II Partnership at the 2002 World Summit on Sustainable Development. Support now includes some 40 countries from all regions of the world.	By 2004, launch Intergovernmental Forum in partnership with the Government of South Africa.	Increased international recognition that mining, minerals and metals are essential for modern living. Increased recognition that mining can contribute to sustainable development by strengthening the economic base of national governments, enabling them to meet their environmental and social aspirations. Increased Canadian influence internationally on policy development for mining, minerals and metals.
Canada is participating in the multilateral research and development (R&D) initiative under the Generation IV International Forum, in close cooperation with nuclear research and government entities in Canada and abroad, such as Atomic Energy of Canada Limited and the United States Department of Energy.	Canada will continue to demonstrate leadership in R&D related to advanced reactor concepts and related energy applications, including the development of the necessary mechanisms and funding, to support Canada's energy-related R&D efforts.	By 2005, put in place a model for Canadian participation among government, industry and academia in the Generation IV program.	Canada remains at the forefront of advanced and innovative nuclear technology development. Commitment in its efforts to ensure a sustainable, safe, secure, economical, environmentally sound and proliferation-resistant nuclear energy option.

Action 3.3: Promote best practices for sustainable development abroad

Issue	Approach	Target	Anticipated outcome
Developing countries require information about their geography, environment and natural resource base in order to promote sound decision-making on issues related to sustainable development. This information can often be effectively and efficiently delivered by the Canadian earth science industry.	Contribute to Canada's foreign policy objectives by promoting opportunities for Canadians earth science industries, particularly through participation in externally funded international development projects related to specific application areas in which earth sciences can make a significant contribution to sustainable development.	By 2005, transfer Canadian technologies and know-how in specific application areas relating to earth sciences to support sound decision-making with respect to sustainable development in developing countries.	Raised awareness of Canadian values internationally through visibility of Canadian excellence in the area of earth sciences for sustainable development and international development.
India currently produces about 90 MT of cement annually (about eight to nine times that of Canada), resulting in the emission of over 80 MT of carbon dioxide annually. India produces 100 MT/year of fly ash per year, and production is expected to double within 10 years. Without the introduction of new technologies and practices to use larger proportions of fly ash in concrete, the production of ordinary portland cement would translate into a significant increase of carbon dioxide emissions. The increased use of supplementary cementing materials as cement replacement in concrete will decrease carbon dioxide emissions for every cubic metre of concrete produced; less fly ash will go to landfills; fly ash concrete can be cheaper than conventional concrete and will be more durable, thus reducing long-term maintenance.	NRCan will strengthen India's ability to reduce greenhouse gas emissions and promote sustainable development, and will work to enhance the capacity and willingness of key stakeholders to effectively use NRCan-developed technology for concrete construction. This will be carried out through an implementation program for High Volume Fly Ash in Concrete (HVFAC) technology, including demonstration projects, transfer of technology activities, and networking with standards and specifying bodies and organizations. This is a CIDA-funded initiative with partners in India.	By 2004, develop project Web site. By 2005, complete four demonstrations projects of HVFAC technology in India. By 2005, complete one series of transfer of technology seminars in large cities in India. By 2004, conduct three training sessions of Indian engineers in Ottawa. By 2005, conduct six training programs on HVFAC technology in India. By 2005, issue technical information (reports, publications) on fly ash and HVFAC in India. By 2005, resolve technical issues dealing with the use of HVFAC in the Indian context.	Global greenhouse gas emissions reduction of 5 to 10 MT/year. Increased awareness by Indian industry, government authorities and specifying agencies of benefits of using HVFAC for sustainable development. Numerous large projects planned or implemented in India using HVFAC.

Investing in people: Building SD Capacity at NRCan

More than simply a goal to be aspired to or an achievable end result, sustainable development is also a process of change, including institutional change. One aspect of the practice of sustainable development at NRCan involves fostering the evolution of SD from its starting point as a high-level policy initiative towards its future as an integral part of organizational culture.

Taking action to improve the efficiency of facilities, waste reduction and improved waste-management practices, implementing green procurement—all are important components of operationalizing sustainable development. But these actions do not address the social side of SD. Social responsibility is a key element of SD and it includes the Department's commitments to its employees, as well as fostering a healthy and productive work environment.

Many NRCan employees are challenged to address sustainable development on two fronts: as it relates to subject of their work in Canada's natural resource sectors, and as it relates to their own work lives as public employees. As an employer, NRCan has chosen to show leadership and support its employees in enhancing their understanding of sustainable development, so they can practise it in their day-to-day activities.

NRCan's SDS 2001 articulated a commitment to strengthening the Department's capacity to advance sustainable development throughout all aspects of its operations. A number of targets were put forward in support of enhancing organizational capacity, including a plan to develop a sustainable development policy course for NRCan staff.

The Sustainable Development Capacity Building Course, first offered in 2001, has provided policy and program officers with up-to-date training and skills. The course aims to contribute to better decision-making by enhancing the participants' knowledge of sustainable development concepts and practices, giving them tools to integrate social, economic and environmental considerations in their day-to-day responsibilities.

Over the two-day course participants:

- review the evolution of sustainable development ideas and practices over the past 15 years,
- study the international and domestic pressures and opportunities for advancing sustainable development in the public and private sectors,
- explore case studies from around the world, examining how public and private organizations are implementing sustainable development in other jurisdictions,
- assess sustainable development ideas, practices and challenges vis-à-vis NRCan's mandate and activities,
- discuss the implications of sustainable development for the Department's roles and responsibilities,
- examine practical tools that can be used to apply sustainable development objectives to decision making and business practices, and
- participate in a workshop session on 'thinking through' the implications for sustainable development implementation in their work.

So far, the course has been offered five times, providing a unique learning opportunity for more than 100 NRCan staff members. In addition to the policy and program officers who were identified as the primary target group for the course, several managers, scientists and co-op students have also participated.

The capacity-building course has proven to be a substantial first step in engaging all NRCan staff in the Department's quest to lead by example when it comes to sustainable development. One of the most important outcomes of the course is the development of an informal network of 'ambassadors' for sustainable development. Employees who have taken the course are now better able to recognize how their work contributes to sustainable development; they are encouraged to share this knowledge with their colleagues and lead by example through their day-to-day actions. Some will no doubt emerge as star players on the team working to help spread understanding of sustainable development throughout NRCan's workforce.

Several 'next steps' have been identified to build on the success achieved so far. Feedback from participants has been used to help guide this course of action. Plans are under way to offer the course in versions geared to managers and scientists, and the course will be brought to NRCan staff across the country by offering it at regional offices.

These efforts, and those that will evolve from them, will keep NRCan moving forward on the path to becoming an organization that practises sustainable development in all aspects of its operations.

Key Result 4: NRCan demonstrates its commitment to sustainable development in its operations

As a federal government organization, NRCan has a responsibility to provide Canadians with a department that is efficiently and effectively managed in all respects. However, to achieve progress towards our vision it will be imperative to go beyond normal business practice. As a champion of the sustainable development of Canada's natural resources, the Department must demonstrate its commitment to the principles of sustainable development in its own operations in order to be able to lead with authority and credibility. Canada's natural resource sectors and allied industries expect the Department to provide a model of sustainable development, as well as the policies and programs that support it.

Operations is the obvious starting point for implementing sustainable development principles in the government context. NRCan has taken on a leading role in the federal government-wide Sustainable Federal House in Order (SFHIO) initiative. The initiative focuses on promoting progress in six priority areas of operations in order to advance sustainable development: energy efficiency/greenhouse gas emissions (buildings); vehicle fleet management; land use management, solid non-hazardous waste management; water conservation; and green procurement. A seventh priority area, human resources management, is considered in terms of management activities that can be undertaken with respect to the other six areas. Further work to promote greater progress in the development of tracking mechanisms, the refinement of performance measures, as well as more comprehensive reporting will give the federal government the ability to better evaluate its progress on its commitments, and the tools required to move forward on implementing comprehensive green operating practices. This initiative is helping the federal government to become a model of environmental excellence in its own operations, and contributing to federal efforts to meet the greenhouse gas emissions reduction target.

A key focus for the Department, within its own house, is furthering its work to implement a comprehensive environmental management system (EMS). An EMS facilitates managing the Department's assets responsibly while minimizing environmental impacts and facilitates pursuing more comprehensive tracking. Aspects to manage include the reduction of energy consumption and emissions from NRCan custodial facilities, as well as the reduction of water consumption.

NRCan recognizes that sustainable development goes beyond environmental targets, and is therefore also emphasizing corporate social responsibility in its relationships with employees and other stakeholders. For example, NRCan identified the need to further develop and implement a department-wide values and ethics program (see Appendix 3) to enable better decision-making and make more consistent choices based on a shared understanding of values. From input from dialogue sessions with staff at headquarters and all NRCan regional offices, a renewed values statement—highlighting Professionalism, Stewardship, Honesty, Respect, and Continuous Improvement—was developed and launched during National Public Service Week 2003. NRCan developed its own departmental values and ethics framework which is aligned with the Treasury Board Values and Ethics Code for the Public Service of Canada, which came into effect on September 1, 2003.

The Department will continue to evolve as a model of sustainable development in both operations and organizational culture, providing leadership within the federal government community and improving our ability to champion sustainable development within Canada's resource sectors and internationally.

Sustainable Federal House in Order

Natural Resources Canada is a co-champion of Sustainable Federal House in Order, an interdepartmental initiative designed to identify and coordinate opportunities to advance the federal commitment to be a leader in sustainable development. Sustainable Federal House in Order oversees the Sustainable Development in Government Operations (SDGO) and Federal House in Order (FHIO) initiatives. Our organization is working together with other Sustainable Federal House in Order departments and agencies to adopt common measurement and reporting methods.

Action 4.1: Improve NRCan operations through sound environmental management

Issue	Approach	Target	Anticipated outcome
Sound environmental management is paramount to achieving the conduct of operations in a sustainable manner. NRCan's Environment Policy and the principles of the ISO 14001 international standard provide the framework for environmental management activities at NRCan. A well-structured, implemented and managed environment management system (EMS) is key to implementing sustainability principles in NRCan operations.	A fully functional EMS within the Department will be implemented. No formal certification will be sought, but the system will be aligned with the principles of ISO 14001, as well as the Greening of Government Operations Policy. The implementation will be done in coordination with all sectors of NRCan. Environmental monitoring activities will be continued to ensure that departmental operations are carried out with minimal environmental impacts. NRCan will measure, store and manage data on environmental aspects of the Department's operations to facilitate environment reporting and planning. NRCan maintains its commitment to continue conducting Environmental Compliance Audits of NRCan facilities with operations of potential environmental impacts.	By 2005, review and update Departmental Environmental Policy (2000) to incorporate the requirements of new legislation/ regulation and government policies. By 2005, review all the environmental aspects related to NRCan operations and conduct baseline studies for aspects identified as significant. By 2005, complete a consolidated database on environmental information. By 2006, complete conformity assessments of all petroleum storage tanks with respect to new federal storage tank regulations. By 2006, establish improvement targets for significant aspects.	A comprehensive view of the environmental aspects of the Department's operations that will enable the development of a formal EMS. A consolidated database, the tool necessary to monitor progress and facilitate reporting and planning. NRCan is better positioned to inform the public and its employees of its progress in achieving sustainability in its operations.
To be a model of sustainable development, NRCan must manage its assets in a responsible manner to minimize environmental impacts. The reduction of risks and liabilities associated with departmental contaminated sites and, where possible, the recapture of the social and economic value, are Government of Canada priorities: 2002 Throne Speech commitment to "accelerate the clean-up of federal contaminated sites" and the Treasury Board's recent Contaminated Sites Management Policy. Brownfields are idle or underused properties where past activities have caused environmental contamination but, nonetheless, exhibit good potential for other uses (or upgrading) and which provide economically viable business opportunities. NRCan's headquarters, the Booth Street Complex, can be considered a brownfield.	The Department will work to minimize the environmental and health risks and the associated liabilities of NRCan contaminated sites.	By 2005, complete further assessment activities where required for currently identified potentially contaminated sites. By 2005, present a strategy to Treasury Board for remediation of contaminated sites where required. By 2009, complete remediation of contaminated sites (contingent on Treasury Board approval). By 2004, complete the Booth Street Redevelopment Strategy. By 2005, present redevelopment strategy to the Treasury Board. By 2008, implement strategy (contingent on Treasury Board approval).	Necessary corrective measures are provided, satisfying due diligence and enabling sustained environment quality. Reduced risk and liabilities related to a departmental contaminated site. Recaptured social and economic value of underdeveloped sites.

Action 4.2: Develop and implement further strategies to improve resource use efficiency and reduce greenhouse gas emissions in NRCan facilities

Issue	Approach	Target	Anticipated outcome
Reducing departmental energy consumption and greenhouse gas emissions from real property assets is essential to achieve sustainable NRCan operations and to achieve the Department's commitments under Federal House in Order and Canada's commitments under the Kyoto Protocol. Federal real property assets contribute 80% of all greenhouse gas emissions from the federal government. As a custodian of more than 250 buildings and more than 300,000 square metres of space, NRCan has committed to significantly reduce its real property greenhouse gas emissions.	In addition to the targets on the right, the Department will continue to implement NRCan's Framework for Use and Management of Office and General Purpose Space, track greenhouse gas emissions on a facility-to-facility basis, maintain existing departmental management processes that take greenhouse gas emissions and energy reductions into consideration (such as asset management plans, building management plans and long-term capital plan), and contribute expertise to existing departmental and interdepartmental initiatives.	By 2004, complete a background and feasibility study with the view to develop a national Sustainable Buildings Policy (new construction, demolition, recapitalization and maintenance). By 2006, draft and implement the Policy. By 2006, identify and develop business cases for custodial facilities that have not participated in the Federal Buildings Initiative. By 2004, investigate the feasibility of realizing, either through innovation, lease or new construction, a sustainable building project. By 2004, make necessary changes to departmental service agreement with Public Works and Government Services Canada to reflect sustainable real property considerations.	Reduced departmental energy consumption and greenhouse gas emissions. Progress towards achieving the Department's target under the Federal House in Order commitment to reduce emissions by 30.6% from 1990 levels by 2012.
Like the reduction of energy consumption and greenhouse gas emissions, the reduction of water consumption is essential to achieving sustainable NRCan operations.	Water conservation activities aim to achieve the following: the reduction of the absolute amounts of water (less water per person or given product or service) and/or the reduction of the rate (using water only when it is needed) at which water is used on a daily basis (sustainable use).	By 2004, consultation on NRCan's Draft Water Conservation Strategy completed, Strategy finalized and approved. By 2004, provide input into the feasibility study for the development of a national Sustainable Buildings Policy. By 2005, establish baseline data of water consumption. By 2006, establish a target to reduce water consumption at NRCan facilities.	The sustainable use of water, which contributes to overall sustainable NRCan operations.

VI: Measuring Performance

The ability to measure progress towards goals is essential to success within any organization, and it is a key aspect of good governance in the context of sustainable development. To ensure that NRCan's actions are contributing to sustainable development on a broader level, transparent verification and evaluation of the Department's performance underpins our approach to sustainable development.

NRCan is committed to raising the bar for sustainable development. In fact, the Commissioner of the Environment and Sustainable Development, the Treasury Broad Secretariat, and the Office of the Auditor General have all recognized NRCan as a best-practice department for its innovative and accountable approach to performance measurement. NRCan shares its expertise and unique approach with other organizations.

As NRCan has a mandate for ensuring the sustainable development of Canada's natural resources, a great deal of the Department's day-to-day work contributes to sustainable development. However, the purpose of the Sustainable Development Strategy is to put forward the 'transformative pieces'—the guideposts that will stimulate action taking sustainable development to the next level, inspiring Canadians and influencing change in those critical areas where the Department is best positioned to make a real difference. In keeping with this purpose, NRCan—with guidance from our stakeholders—has chosen four key results to be the focal points for ***Moving Forward***. NRCan's approach to reporting on the Strategy is grounded in our experience and expertise in reporting on all departmental activities through the Performance Measurement Framework (PMF).

Photo credit: Canadian Wood Council

Assessing progress towards the four key results

Moving Forward presents commitments—actions supported by specific, time-bound targets—arrayed around the four key results that were deemed the most important objectives to be achieved within the timeframe of the Strategy. These commitments represent NRCan's part in moving Canada towards the Department's long-term vision of sustainable development. While NRCan has a significant role to play in realizing the key results for Canada, they cannot be attained by NRCan acting alone.

For that reason, we selected a suite of macro-level metrics to illustrate progress towards achieving the four key results. These metrics are listed on the Strategy's Summary Chart. Actions undertaken by NRCan may contribute to more than one macro-level indicator; for example, building skills and providing information can both contribute to increased SD capacity within the natural resources sector. However, as skills themselves are difficult to measure, we will be looking at broader metrics such as employment opportunities.

These metrics are complemented by verification of progress on the targets set out for each of the actions in the strategy. This progress is reported semi-annually through the Department's online tracking system, the Sustainable Development Action Items Management System (SD-AIMS). Quite simply, if our micro actions are aligned to our broader indicators, and if we can answer the question: "Did we do what we said we would do?", then we are positioned to make adjustments to our actions in support of our longer-term vision.

Performance Measurement Framework

This two-tiered approach will be complemented by NRCan's Performance Measurement Framework (PMF) established in SDS 2001. The PMF is the foundation for all of the Department's planning and reporting documents. It articulates a set of Department-wide strategic outcomes, with associated objectives and performance. The Framework is designed to increase NRCan's accountability to Canadians and parliamentarians by providing a transparent set of measures against which NRCan's progress and direction can be charted over a four-year reporting cycle.

As part of the continuous-improvement philosophy, NRCan is currently in the process of assessing these indicators. A four-year cycle was completed in October 2003; therefore it will be necessary to examine the indicators within the SDS to establish which are relevant for the updated PMF. (The PMF is currently under review. It is due to be formalized in 2004 and set out in the 2005–2006 departmental Report on Plans and Priorities).

Performance indicators may also be used to assess how the SDS actions are contributing to achieving the four key results. Each indicator is an objectively assessable measure: either a **numerical target, a directional target** (i.e. maintain or improve performance), or a finding based on **trend analysis and monitoring** (used when it is difficult to determine the Department's contribution to a 'macro' indicator of high importance to NRCan).

NRCan's commitment

This process of accountability and transparency allows Canadians to verify whether NRCan is meeting its mandate, and whether that mandate is contributing toward the broader goals of sustainable development.

By monitoring the performance of the Sustainable Development Strategy, Natural Resources Canada is demonstrating our commitment to making measurable progress towards the sustainable development goals that are important to Canadians.

Appendix 1

Departmental Mandate and Organization

Natural Resources Canada is an economic, science-based department with a mandate to: promote the sustainable development and responsible use of Canada's mineral, energy, and forestry resources; develop an understanding of Canada's landmass; and, collect and disseminate knowledge on sustainable resource development. The Department conducts research and technical surveys to assess Canada's resources, including the geological structure and legal boundaries. NRCan is also authorized to provide the national framework of reference for spatial positioning; prepare and publish maps; conduct scientific and economic research related to the energy, forestry, mining and metallurgical industries; and to establish and operate scientific laboratories for these purposes.

Departmental Mandate

NRCan is responsible for federal resource policies, and science and technology that support the sustainable development and competitiveness of the energy, forest, minerals and metals sectors, and their allied industries. The Department enables the Government of Canada to address resource issues in a comprehensive manner, from a national perspective.

By legislation, the Minister of Natural Resources is responsible for:

- Coordinating, promoting, recommending and implementing policies, programs and practices pertaining to the mandate of NRCan;
- Fostering the integrated management and sustainable development of Canada's natural resources;
- Helping in the development and promotion of Canadian scientific and technological capabilities;
- Gathering, compiling, analyzing, coordinating and disseminating information respecting scientific, technological, economic, industrial, managerial, marketing, and related activities and developments affecting Canada's natural resources;
- Participating in the development and application of codes and standards for spatial positioning and natural resource products, and for the management and use of natural resources;
- Improving remote-sensing technology and promoting the development of the Canadian remote-sensing industry;
- Encouraging the responsible development and use of Canada's natural resources, and the competitiveness of Canada's natural resource products;
- Working to widen and promote markets for Canada's natural resource products and geomatics industries, both at home and abroad; and,
- Working in partnership with provincial/territorial governments and non-governmental organizations in Canada, and promoting cooperation among nations and international organizations.

Other Agencies

NRCan maintains a special relationship with agencies which report to Parliament through the Minister of Natural Resources. These agencies include the National Energy Board, the Canadian Nuclear Safety Commission (formerly Atomic Energy Control Board), Atomic Energy of Canada Limited, the Energy Supplies Allocation Board, Canada-Newfoundland Offshore Petroleum Board, Canada-Nova Scotia Offshore Petroleum Board and the Cape Breton Development Corporation. Specific consideration of these agencies is not included in the Sustainable Development Strategy of the Department.

Organization

NRCan is organized into six sectors, three branches, and the Office of the Chief Scientist.

The **Corporate Policy and Portfolio Coordination Branch** is NRCan's centre for strategic policy leadership, expertise and advice for departmental and portfolio priorities, horizontal policy/science issues and initiatives, and sustainable development in Canada and internationally. It leads the development and implementation of the Sustainable Development Strategy. The Communications and Audit and Evaluation branches, contribute to improved accountability as well as an increased understanding of NRCan's mandate and programs among Canadians, clients and employees.

The **Earth Sciences Sector** is the Government of Canada's principal agency for earth science knowledge and information. Geomatics Canada provides a reliable system of surveys, remotely sensed data as well as geographically referenced information describing the Canadian landmass; the Geological Survey of Canada is a principal contributor to a comprehensive geoscience knowledge base of Canada; and, the Polar Continental Shelf project contributes to scientific research in our Arctic regions by providing comprehensive logistics support.

The **Canadian Forest Service** promotes the sustainable development of Canada's forests and the competitiveness of the Canadian forest sector for the well-being of present and future generations of Canadians. As the premier forestry S&T research and national policy coordination agency in Canada, the Canadian Forest Service plays a pivotal role in building consensus on key forest issues, in shaping the national and international forest agenda, and in generating and transferring knowledge through its Canada-wide world-class forestry research centres.

The **Minerals and Metals Sector** promotes the sustainable development of Canada's minerals and metals resources industry by integrating economic, social and environmental objectives. It provides policy advice, S&T, as well as commodity and statistical information in support of decision making. It is also the federal government's primary source of expertise on explosives regulations and technology.

The **Energy Sector** promotes the sustainable development and safe and efficient use of Canada's energy resources through its policies, programs, and science and technology. It assesses the potential economic, regional, international and environmental implications of Canada's energy production and use. It also provides technical knowledge and advice to the energy industry and to government. Its knowledge base helps the Government of Canada to formulate policies, implement regulations, enhance job and wealth creation, and meet its international commitments.

The **Large Final Emitters Group** is responsible for working with key industry sectors to reduce annual greenhouse gas emissions in accordance with the *Climate Change Plan for Canada*, by designing policies and measures that are effective in encouraging reductions and help to maintain the competitiveness of Canadian industry.

The **Corporate Services Sector** provides functional direction to the Department in the effective and efficient management of resources in the areas of finance, administration, human resources, information management/information technology, real property, safety and security, and environmental affairs.

Created in 2003, the **Office of the Chief Scientist** is responsible for positioning Natural Resources Canada as a leader in the performance of science and technology. The Office works closely with the departmental science sectors as well as other science-based departments and agencies, both nationally and internationally, to ensure the excellence and relevance of our laboratories and science programs. The Office of the Chief Scientist also oversees the **NRCan On-Line Secretariat**, which is enabling NRCan to deliver its programs and services to Canadians through the Internet.

Appendix 2

Summary of Consultations Leading Up to SDS—*Moving Forward*

NRCan's experience with consultations on sustainable development has demonstrated that a meaningful dialogue with interested parties results in a credible strategy—which, in turn, results in commitments that make a valuable contribution to sustainable development. This dialogue also fosters a common understanding of the issues, as well as shared ownership of the strategy among all partners and stakeholders.

The Department released the discussion paper, ***Moving Forward on Sustainable Development***, in June 2003. This paper served as the basis of the 2003 consultations. The paper set out a long-term vision and an outline of the priorities that the Department proposed to advance in support of the vision. The paper was intended to stimulate dialogue on the proposals and refine the priorities to be advanced through the Strategy. The consultations enabled the Department to ensure that the directions set out in the discussion paper were meaningful and relevant, addressing those challenges to sustainable development that stakeholders feel NRCan is positioned to address. The consultations also sought input on possible action commitments.

The Department was guided throughout the process of developing *Moving Forward* by an external advisory panel comprising representatives from industry, Aboriginal organizations, non-government organizations, academia, and other government departments. The advisory panel met several times and served as a 'sounding board' at each stage in the process, providing consistent and insightful guidance that complemented the series of meetings held with external stakeholders and staff. NRCan first convened this advisory panel in 2000 to guide the development of its 2001 Strategy. Several members were able to once again participate in 2003, ensuring continuity and enabling the Department to move up the learning curve.

External multi-stakeholder meetings were held in Ottawa, Halifax, Calgary and Vancouver; internal meetings were held with NRCan staff. A number of the external meetings were organized in conjunction with other federal departments. In particular, a meeting was scheduled in advance of the biannual Meet the North conference held in Edmonton (with Industry Canada), with participants from the Northwest Territories, Nunavut and the Yukon. NRCan also participated in coordinated sessions in Atlantic Canada that were organized by the Atlantic Canada Opportunities Agency. NRCan was invited to participate along with Industry Canada, Environment Canada, and Public Works and Government Services Canada.

The Department also solicited written input to the strategy. A postcard was mailed to 1200 stakeholders to inform them about the discussion paper and invite them to fill out a questionnaire. As well, a letter and copy of the discussion paper were mailed out in advance of the meetings to interested stakeholders who had participated in the development of the 2001 Strategy.

The consultations revealed that NRCan—in order to develop a focussed strategy—would have to ask some hard questions and set a few essential priorities. To that end the discussion paper accomplished its goal, sparking

provocative discussions about where NRCan should focus its efforts. The Department received meaningful feedback on the key issues that should be pursued for its third SDS, which is reflected in the issue summary presented in Section III of this document. We also received direction on the vision and key results that guide the strategy, including advice on where we should focus our efforts and what sort of results we should be trying to achieve. Finally, we received specific suggestions for action commitments.

The results of the consultations on ***Moving Forward*** have been summarized in the report *What You Said 2003*. This report is available on the Natural Resources Canada Sustainable Development Web site (www.nrcan-rncan.gc.ca/sd-dd).

Appendix 3

NRCan Initiatives to Internalize Corporate Social Responsibility

Corporate Social Responsibility (CSR) describes the commitment by an organization to meet stakeholder expectations on economic, environmental and social performance. It is often seen as the business contribution to sustainable development. Within NRCan, activities under the Modern Comptrollership Initiative highlight the Department's efforts to lead by example on CSR.

Values and Ethics at NRCan

Following on the Auditor General's 1995 Report, and *A Strong Foundation. Report* of the task force on public service values and ethics (The Tait Report, 1996), which identified the need for greater government-wide emphasis on values and ethics, NRCan began work on a Department-wide values and ethics initiative. The aim of the initiative is to enable better decision-making at all levels within the Department, and encourage employees to make more consistent choices based on a shared understanding of values.

NRCan's objective in initiating a dialogue with employees on values and ethics issues was to develop a sustainable values and ethics culture that meets governmental and stakeholder expectations for NRCan. The process of engaging employees in an inclusive discussion helps to promote social awareness and responsibility within the organization.

Throughout 2002, groups of NRCan employees responded to the invitation to take part in workshop sessions to consider the next steps in renewing values and ethics within the Department. Dialogue sessions held at the Ottawa headquarters and all NRCan regional offices encouraged staff to contribute to the development of a renewed values statement. The revised values statement, focussing on professionalism, stewardship, honesty, respect and continuous improvement, was launched in June 2003, during National Public Service Week.

The Treasury Board released a new Values and Ethics Code for the Public Service of Canada, which came into effect on September 1, 2003. The Code sets out the values by which public servants should be guided in their work and professional conduct, including updated conflict of interest and post-employment measures. NRCan developed its own departmental values and ethics framework which is aligned with the Treasury Board Code.

Modern Comptrollership Initiative

NRCan's work on values and ethics is part of the larger Modern Comptrollership Initiative. Modern comptrollership is a management philosophy that promotes delegation of accountability to the right level for effective program delivery and with the appropriate controls in place to effectively manage risk. Within this context, it is about using sound management practices to make better program and resource decisions. Shared values and ethics is one of the four pillars of this philosophy; the other three are integrated performance information, mature risk management, and accountability and stewardship.

NRCan Values Statement
Professionalism
Using our expertise in science, technology, policy and programs, we look at natural resource issues from the local, national and international perspectives that are important to Canadians. We perform our tasks with competence, diligence, and dedication.
Stewardship
We are committed to improving quality of life for Canadians through sustainable resource development. We are accountable for and accept responsibility for our actions.
Honesty
In our relationships with each other, our partners and stakeholders, we speak truthfully and act in a transparent manner.
Respect
In our relationships and interactions, we embrace our diverse makeup of gender, age, race, and culture and communicate in the official language of choice.
Continuous Improvement
We continually strive for excellence in our science, policy, programs and initiatives, management practices and processes.
Shared values and ethics is important to maintain the highest standards of public service
Canada

The need for improved services to Canadians and fiscal restraint has resulted in important changes in the federal public service. Greater emphasis is being placed on exploring new ways of working, including forming partnerships with stakeholders to deliver effective, affordable programs and services. Modern comptrollership is one of the key initiatives supporting that transformation.

As a pilot department for Treasury Board-supported modern comptrollership initiative, NRCan was expected to implement modern management practices into our organization within five years. During this time, the Department has become a government leader in areas such as human resources and finance. We have made significant progress and we will continue in our efforts to become a better managed, more innovative department.

The ultimate aim of this initiative is to improve NRCan's ability to advance the Government of Canada's commitment to ensuring the quality of life of Canadians and building the Canada we want, for ourselves and for future generations.

Web links:

NRCan site
http://www.nrcan.gc.ca/css/fmb/fmb-e.htm

Treasury Board Secretariat Modern Comptrollership site
http://www.tbs-sct.gc.ca/cmo_mfc/

Treasury Board Secretariat Office of Values and Ethics
http://www.tbs-sct.gc.ca/veo-bve/

Appendix 4

Natural Resources Canada and the World Summit on Sustainable Development

Over ten years ago, at the 1992 United Nations Conference on the Environment and Development (UNCED—also called the Earth Summit), held in Rio de Janeiro, the international community adopted Agenda 21, a global blueprint for action on sustainable development.

The World Summit on Sustainable Development (WSSD) which took place in the summer of 2002, in Johannesburg, South Africa, convened as a ten-year retrospective on global efforts to implement sustainable development. Thousands of delegates reflected on the progress made, examined the barriers to sustainable development, and identified further challenges to the implementation of Agenda 21.

Natural Resources Canada played a formative role in shaping Canada's contribution to the WSSD, including some of Canada's positions taken during the negotiations of the Johannesburg Plan of Implementation (JPOI)—a key outcome of WSSD. The Department brought forward its wealth of experience in sustainable forest management, stressed the importance of a broad energy supply mix in the provision of energy services, and launched the *Global Dialogue on Mining, Minerals, Metals and Sustainable Development*, in partnership with South Africa. NRCan also championed the critical role of sound science, particularly geoscience and geomatics in support of land and resource management.

Post-Johannesburg, NRCan continues to work with its partners—in Canadian industry, other federal departments, all levels of government, non-governmental organizations, educational institutions, Aboriginal organizations and Canadian communities—as it delivers on its national mandate and the commitments made in Johannesburg. NRCan's contributions are made primarily through the Department's ongoing scientific research, information sharing, and policy and program development. This experience and expertise helps to inform and shape Canadian foreign policy related natural resource issues, particularly where resource issues are linked to global concerns such as climate *change and access to energy services.*

NRCan, as a member of the Canadian delegation to the Johannesburg Summit, had the opportunity to work together with delegates representing other countries to address the barriers and challenges to the implementation of sustainable development. Where the JPOI addresses natural resources issues, the recommendations, goals and objectives echo many of Canada's own goals and objectives. In some cases, Canada's policies and performance exceed the recommendations of the JPOI.

NRCan's Sustainable Development Strategy reflects the JPOI goals and objectives that resonate with its national mandate and Canadian circumstances. The Department will continue to be engaged in Canada's participation in the United Nations Commission on Sustainable Development's annual meetings, the main forum for follow-up to Johannesburg. NRCan's science and policy expertise will shape Canadian participation at the twelfth and thirteenth sessions of the UNCSD, with a particular focus on the energy discussions for the thirteenth session. It is through this process that the Department will report on its activities related to JPOI implementation, and reflect the evolving Canadian experience of natural resources' contribution to sustainable development.